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PROCEEDINGS

OF THE

SCIENTIFIC MEETINGS

OF THE

ZOOLOGICAL SOCIETY

OF LONDON

FOR THE YEAR

1883.

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OF THE

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January 16, 1883.

Prof. Flower, LL.D., F.R.S., President, in the Chair.

The Secretary read the following report on the additions to the Society's Menagerie during the month of December 1882:—

The registered additions to the Society's Menagerie during the month of December were 55 in number. Of these 34 were acquired by presentation, 12 by purchase, 2 were born in the Gardens, and 7 were received on deposit. The total number of departures during the same period, by death and removals, was 118.

Mr. Dresser exhibited the specimen of a Bee-eater (*Merops philippinus*) stated to have been obtained near the Snook, Seaton Carew, in August 1862 (*cf.* Hancock, B. Northumb. &c. p. 28), and stated that it was an old example, probably a male, in full plumage. Mr. Dresser observed that it was rather singular that this remote southern and eastern species, which had never previously been recorded from any part of Europe, should have been shot in Great Britain.

The following papers were read:—

1. On the Freshwater Shells of the Island of Socotra collected by Professor I. Bayley Balfour. By Lieut.-Colonel H. H. Godwin-Austen, F.R.S., F.Z.S. &c.—Part III.

[Received January 16, 1883.]

(Plates I. & II.)

The shells now treated of belong to the genera *Planorbis*, *Hydrobia*, and *Melania*. The first is the only representative of the *Limnæidæ* in Socotra, for the very generally distributed genus *Limnæa* appears certainly absent. The freshwater shells brought home by Professor Balfour are well represented numerically; and a great number of young specimens occurred caught up in the water-plants that were collected; but all are referable to the above genera, and not a single bivalve of any kind was detected among them.

Although three of the species of *Melania* are well known shells with an extended range, and have been often figured in various works, yet they vary much in form, coloration, and sculpture with change of conditions. I have therefore given figures of their Socotran representatives. I think, when we are trying to slowly work out the causes of the distribution of species over certain areas, we cannot be too particular, too minute, and too exact with the species that we are now collecting, and more particularly with island forms. I do not imagine that in Socotra the more or less stagnant pools are large or numerous, or the streams of great extent; and this must be the case with many small islands. The formation of a Military or a Coaling-station is very apt to lead to the destruction of such pieces of water or marshy ground—the one conducted into new channels, the other drained for sanitary purposes, destroying the original molluscan inhabitants together with many of the plants, insects, and other forms of life. Again, the introduction of plants with the occupation of islands by new races, leads to the transport of species from other countries; and as time goes on the history of such aided emigration is lost, and there will be a tendency to weaken original deductions made now on the distribution of species as connected with the former outlines of land and sea. If mere lists of a fauna, with perhaps meagre deescriptions only, be drawn up, and a species become extinct and the original collection destroyed, how easy is it to throw doubt on the authenticity and correctness of the record, or the identification of the particular species. When drawings are added there is less possibility of such doubts arising.

The freshwater shells we have before us have certainly more of an Indian character than an African one; and, again, as I pointed out in a previous paper, they extend to Madagascar and the Mascarene Islands to the south. In fact the only species in the present series that has an African habitat is the extremely wide-spread *Melania tuberculata*. *Planorbis cockburni* may be also African; but it is a form of a group of that genus which has a greatly extended range muscular column (*a* in fig. 12, pl. xl.) dividing the anterior membranous flap of the valve into right and left cusps, a single well-marked right anterior column (*b* in fig. 12, pl. xl.), from which was given off posteriorly a small "septal flap" (*pc* in figs. 14, 15, pl. xl.) representing the septal membranous flap of a typical mammalian right cardiac valve in a very reduced state.

Heart No. 2 differed in two chief features from heart No. 1. First, the right anterior muscular column was broken up into three small slips instead of being present in one piece (*b b b* in fig. 13, pl. xl.), and two peculiar additional muscular slips (*m*, *n*) were developed in the same region; whilst, secondly, there was no trace of any thing which could be properly called even a rudiment of the septal membranous flap of the valve, although the point of junction of the right border of the membranous part of the valve with the wall of the heart was indicated as a bare representative of such septal extension.

The seven hearts since examined present further variations.

The heart lent to me by Dr. Pye Smith has a closely similar arrangement of the muscular bands and membrane of the right cardiac valve to that exhibited by my No. 1. It differs in having a *smaller* rudiment of the septal valve than my heart No. 1.

Of Professor Balfour's specimens four agree more or less closely with heart No. 2 of my former paper. The most extreme of these is represented in Plate III. fig. 4, where it is seen that not only is the right anterior muscular column represented by separate muscular slips, but these are very small. There is a curious downward growth of the membranous substance of the valve in this region, and an adhesion of the vertically extended membrane to the septal wall of the heart (Plate III. fig. 4, *xc*), which is similar to the condition of the same part in the *Echidna*-heart (Plate IV. figs. 6, 7, *xc*). The important feature about this *Ornithorhynchus*-heart, beyond the absence of a septal valve-flap, is the evanescence of the muscular substance of the right anterior column.

In most marked contrast to this are the two other hearts of Professor Balfour's six specimens. In both these the region of the right cardiac valve, corresponding to the right anterior muscular column of my heart No. 1, is particularly fleshy. In Plate III. figs. 1, 2, 3, the more remarkably developed of these two hearts is drawn. It will be seen that the right extremity of the valve is not merely traversed by a muscular column, but it has additional muscular substance developed in it, so that it presents the aspect of a broad fleshy area (Plate III. figs. 1, 2, 3, *b*, *b*) with no membrane on its outer or extreme right border. The muscular substance, in fact, rises up in a broad sheet from the wall of the ventricle and is inserted into the anterior part of the auriculo-ventricular ring in a form which resembles that of the fleshy Sauropsidan right cardiac valve more strikingly than does that presented by any other of the specimens examined.

The membrane in this heart is reduced very considerably in proportional area as compared with muscle: a little further development of muscular substance would bring about the union of the right lateral muscular mass, *bb*, with the great anterior muscular column, *a*.

No trace of a septal membranous valve-flap exists in this heart.

It is a noteworthy fact, in view of the statement which has been made by Gegenbaur as to the existence of a septal portion to the right cardiac valve of *Ornithorhynchus*, that, in the nine specimens examined by me, only two, No. 1 (of my former paper) and Dr. Pye Smith's specimen, have any thing entitled to be called a septal flap; and in both these cases it is exceedingly small, fringing one third only or less of the septal margin of the auriculo-ventricular ostium.

In seven of the hearts examined a septal portion of the valve was *not* present.

Comparison with the Right Cardiac Valve of Casuarius *and* Crocodilus.—I have introduced, in the Plates illustrating this note, drawings (carefully prepared from dissections in my possession) showing the right cardiac valve of the Cassowary (Plate III. figs. 5, 6) and the corresponding structure of the Crocodile (Plate IV. figs. 1, 2).

Both are prominently distinguished from the corresponding structure in *Ornithorhynchus* by having the anterior flap of the valve entirely muscular; no membranous area is present in that flap, either in Cassowary or Crocodile.

The Crocodile's right cardiac valve consists of two nearly equally large flaps or lobes, an anterior (Plate IV. figs. 1, 2, *a*) and a septal (*pp*). The anterior portion of this valve is comparable with the fleshy masses *b b* and *a* of the *Ornithorhynchus*-heart drawn in Plate III. fig. 1; but there is absolutely nothing in the heart of *Ornithorhynchus* which has any relation to the septal flap, *pp*, of the Crocodile's heart, excepting the rudiment mentioned above as found in only two hearts out of nine. The septal flap in the Crocodile is larger than the anterior muscular flap, and is almost entirely membranous. Its septal face, however, is invaded to a certain extent by small muscular bands.

I cannot consider that Gegenbaur is correct in indicating a correspondence between the structure of the right cardiac valve in *Ornithorhynchus* and *Crocodilus* closer than that which obtains between the Monotreme and other Sauropsida with fleshy right cardiac valve.

On the other hand, in the bird's right cardiac valve, Plate III. figs. 5 and 6, we find no septal lobe (either membranous or muscular) to vitiate the comparison with that of *Ornithorhynchus*; and I must maintain that Prof. Owen was more correct in pointing out resemblances between the right cardiac valve of *Ornithorhynchus* and that of birds than Gegenbaur has been in assimilating the former to the corresponding structure in Crocodiles. The agreement, such as it is, by no means tends necessarily to indicate any special morphological relationship between *Ornithorhynchus* and birds, which have been conclusively shown by Huxley and by Gegenbaur to have no nearer genealogical meeting-point than in the forefathers of the common ancestor of Sauropsida.

The specialization and separation from the ventricular wall of the muscular slip *e* in the Cassowary's heart is a marked modification of a part which can be traced in the mammalian heart (see former paper pl. xl. *e*). The fact that in the bird the muscular substance of the large mass *a b* runs upwards to the auricular ostium from the outer or free ventricular wall rather than from the ventricular septum, as in *Ornithorhynchus* and other Mammals, appears to me to have very little importance. The moulding of the ventricular cavities may very readily result in an apparent dislocation of parts, so as to give the muscular upgrowths of the ventricular wall at one time a septal, at another time a free-wall attachment. This variation is seen in higher mammalian hearts, as for instance in the Seal (*Phoca vitulina*), where important musculi papillares are attached, not (as is usual) to the septal, but to the free ventricular wall.

Lumen of the Right Ventricle in Ornithorhynchus.—In figs. 3 and 4 of Plate IV. sections are represented taken across the ventricles of the heart of *Ornithorhynchus* and *Lepus*. The drawings are intended to show the Sauropsidan character of the heart of *Ornithorhynchus*, in that its right ventricle appears thus in section as a crescentic sac embracing the very thick-walled cylindrical left ventricle, as in Birds and Reptiles, whilst in the normal Mammalia as represented by *Lepus* the right ventricle does not embrace the left ventricle so closely, and presents, instead of a strongly convex septal wall, a nearly plane one.

Right Cardiac Valve of Echidna hystrix.—I am not acquainted with any figure of the right cardiac valve of the second genus of Monotreme Mammalia, *Echidna*. Prof. Owen, in vol. iii. of his 'Anatomy of Vertebrates,' p. 517, thus describes it:—"The tricuspid valve is membranous and consists of one principal portion closing the outer angle; the free margin of the valve is attached to the extremity of a large fleshy column arising by different roots from both the fixed and the free walls of the ventricle; a short fleshy column is attached to the left extremity of the valve; some chordæ tendineæ are fixed to its right angle." The membranous character of the valve and "the large fleshy column (*a*) arising by different roots (*x* and *y*)" will be recognized in the drawings on Plate IV. figs. 5, 6, 7. I am not able any further to identify in the hearts kindly placed at my disposal by Professor Flower the other features mentioned by Professor Owen.

As compared with the hearts of *Ornithorhynchus* already described, the two *Echidna*-hearts present one important difference. The membranous substance of the valve is not *traversed* by the muscular columns or musculi papillares connected with it. These muscular columns are simply inserted into or fixed to the membrane, and do not, as in *Ornithorhynchus*, pass upwards through it so as to be inserted into the auriculo-ventricular ring. Membrane alone depends from that ring, as in the Marsupial and Placental Mammalia. At the same time an equally important agreement with *Ornithorhynchus* and difference from other Mammalia is presented by *Echidna* in a leading feature of the construction of its right cardiac valve. This feature is the total absence (in the two specimens studied by me) of a septal flap. This character is clearly exhibited in the three dissections drawn in Plate IV. figs. 5, 6, 7.

The muscular columns (musculi papillares) agree pretty closely with those of some *Ornithorhynchus*-hearts in number and origin from the ventricular wall. There is a great anterior muscle *a*, and two right anterior muscles *b b*. Near the pulmonary artery (left angle) there is a well-marked left anterior or "conal" muscle as in *Ornithorhynchus* (see pl. xl. of former paper, *e*).

Whilst these papillary muscles of *Echidna* differ from those of *Ornithorhynchus* in not traversing the membranous valve so as to reach the auriculo-ventricular ring, it would be wrong to suppose that they are attached to the membranous valve by chordæ tendineæ as in Marsupials and Placentals. They are not so, but are distinctly intermediate in the character of their attachment between *Ornithorhynchus* and the other Mammalia. The great anterior muscle is wedged into the membrane of the valve (see Plate IV. fig. 6). The adjacent right anterior papillary muscle has two slips of the membrane of the valve reaching down to it, approaching in character true chordæ tendineæ, whilst the extreme right papillary muscle (*b'*) is wedged into the membrane, as is the great anterior column. The connexion between the muscle, *e*, and the membrane is also direct.

The form of the ventricles of the Echidna's heart is more pointed towards the apex than in the Ornithorhynchus and thus more bird-like. The septal wall of the right ventricle is even more convex than in *Ornithorhynchus*, and shows more numerous muscular ridges (columnæ carneæ.)

Generalization as to Heart of Monotremata.—We are now in a position to formulate as a distinctive character of the Monotremata amongst Mammalia a peculiarity of the right cardiac valve. This is *not* its muscular constitution, but the deficiency of a septal flap. Less important is the absence of chordæ tendineæ from the valve in both *Echidna* and *Ornithorhynchus*, and the close adhesion of the muscular substance of the papillary muscles to the membrane of the valve. In *Ornithorhynchus*, but not in *Echidna*, contrary to what is observed in other mammals, the muscular tissue of the papillary muscles invades in greater or less quantity the membranous valve, and is continued as one or more varying muscular columns traversing the membrane, to be inserted directly into the auriculo-ventricular tendinous ring.

Considerations derived from the Facts of actual Development.—An admirable memoir by Dr. A. C. Bernays, of St. Louis, Missouri, on the "Developmental History of the Atrio-ventricular valves," is published in the second volume (1876) of Gegenbaur's 'Morphologisches Jahrbuch,' and has come to my knowledge since writing the account of my observations given above.

Dr. Bernays's memoir is a careful exposition of facts, brought together under the direction of Gegenbaur, with the view of giving a detailed basis for the conclusion already formulated by that philosophic anatomist, viz. that "the atrio-ventricular valves are, together with the chordæ tendineæ, (actually in individual development) differentiations of a part of the original muscular network forming the wall of the ventricle." In accordance with this conclusion, Gegenbaur has already, in his 'Elements of Comparative Anatomy,' observed that the muscular right atrio-ventricular valve of *Ornitho-*

rhynchus presents, in the adult, a condition which is common to all Mammalia as a transient phase of embryonic development.

Dr. Bernays distinguishes four stages in the ontogeny (actual development) of the mammalian atrio-ventricular valves. In stage no. 1 he finds valve-like processes of the wall of the heart which are simply projections of the endocardium, and have nothing to do with the ventricular musculature. Such valves are comparable to the watch-pocket valves of the Fish and Amphibian heart. In stage no. 2 a relation is established between these endocardial processes and the musculature of the heart by the growth of muscular bands on their under surface. In stage no. 3 the muscular bands connected with the endocardial processes attain a relatively very great size, and effectively constitute the valve, the original endocardial processes becoming unimportant by their relative diminution in size; thus a *secondary* atrio-ventricular valve of muscular composition arises. In stage no. 4 the degeneration of the muscular tissue and its replacement by membrane is effected, and first the membranous condition of the flaps, then of the chordæ connecting the flaps with the remnant of the muscular tissue now known as papillary muscles, is brought about; thus the purely muscular secondary valve becomes membranous, whilst only the papillary muscles are left to tell of its original condition.

As Bernays has pointed out, the right cardiac valve of *Ornithorhynchus* corresponds to the third stage of the mammalian ontogenetic development, whilst the left cardiac valve of that animal corresponds to the commencement of the fourth stage, in which the muscular tissue has disappeared from the upper portion of the valve, but the attached portion of the papillary muscles has not yet broken up into chordæ tendineæ.

Whilst confirming this distinction between the right and left cardiac valves of *Ornithorhynchus* (see my former paper for a figure of the left cardiac valve), I would further emphasize the fact that the condition of the right cardiac valve in *Echidna* is precisely that described by Bernays as the commencement of his fourth stage. Bernays figures (plate xxxii. fig. 6) an adult human heart, in which one of the papillary muscles of the right ventricle has precisely that direct attachment to the membranous part of the valve and deficiency of chordæ tendineæ which I have described as characterising *Echidna*'s right cardiac valve. *Echidna* is thus, when judged by the series afforded by the facts of ontogenesis, distinctly intermediate in this respect between *Ornithorhynchus* and the higher Mammalia.

We may further inquire what light the ontogenesis of the mammalian heart throws upon the absence of the septal flap in the Monotremata. It appears that the consideration of ontogenesis enhances the importance of the distinction between Monotremes and other mammals afforded by this character. According to Bernays the Crocodile-heart is in the second stage of development. The membrane of the large septal valve is not due to the degeneration of a secondary muscular valve, but is the primary endocardial valve;

the muscular bands found on its deep septal face (noted above in my description of it) are the incipient attachments of the ventricular muscular wall described as characterizing the second stage of development of the mammalian heart (see above). Accordingly we have no reason for regarding the minute rudiment of a septal flap which occurs in some *Ornithorhynchus*-hearts as corresponding to the septal flap of the Crocodile's right ventricle. There is no ground for regarding that rudiment as a part of the primary endocardial valve. It is rather an incipient and abnormal extension of the secondary valve, the muscular trabeculæ involved in the development of the secondary valve being, in these cases, widely connected so as to encroach on the septal face of the ventricle in place of being restricted completely to the anterior face. Between this condition and that of the fully formed septal flap of other mammals there is a wide gap.

There seem to be no facts which would lead one to trace the Monotreme-heart to an ancestor in which the secondary muscular valve was fully developed both in its anterior and its septal portions. From such an ancestor it would, no doubt, be *possible* to derive the Monotremes, on the one hand, by suppression of the septal portion, and the other Mammalia, on the other hand, by retention of the whole valve with degeneration of its muscular substance. But in view of the fact that the secondary muscular valve is *not* found to develop a septal portion in any other Vertebrates than the higher Mammalia, it is more probable that the ancestor of the Monotremes had no such septal development, that the rudiment of such septal development found in rare cases in Monotreme-hearts is an *incipient* rudiment, and that the full development of the septal half of the secondary right cardiac valve (in Bernays's sense) is a new departure and special characteristic of the non-cloacal Mammalia.

EXPLANATION OF PLATES III. and IV.

Letters in both Plates.

a. Great anterior muscular column or papillary muscle.
b. Right anterior muscular column.
b'. Second (extreme) right anterior muscular column.
e. Left anterior or "conal" muscular column.
x, *y*. Columnæ carneæ connecting the base of the great anterior muscular column with the anterior ventricular wall.
rac. Right anterior membranous cusp.
lac. Left anterior membranous cusp.
xc. Downward vertical extension and attachment of the membrane of the valve (possibly to be regarded as a rudiment of a septal flap).
pp. Membranous septal flap of the right cardiac valve of the Crocodile.
PA. Base of pulmonary artery.
RV. Right ventricle.
LV. Left ventricle.

PLATE III.

Figs. 1, 2, 3. Three dissections of the right ventricle of a heart of *Ornithorhynchus*.
4. Similar dissection to fig. 2, of another heart of *Ornithorhynchus*.
5. Right ventricle of the Cassowary.
6. The same with the cardiac valve divided.

PLATE IV.

Fig. 1. Portions of the right ventricle of a Crocodile, dissected to show the cardiac valve.
2. The same with the fleshy valve *a* divided, exposing the subjacent membranous flap, *pp*.
3. Transverse section of the ventricles of *Ornithorhynchus*.
4. A similar section of a Rabbit's heart.
5, 6, 7. Three dissections of the right ventricle of the heart of an *Echidna*.

3. Descriptions of new Genera and Species of Asiatic Lepidoptera Heterocera. By F. MOORE, F.Z.S.

[Received December 14, 1882.]

(Plates V. & VI.)

Fam. CHALCOSIIDÆ.

–HISTIA FRATERNA, n. sp.

Allied to *H. papilionaria*, Guér. *Female*. Fore wing similar; hind wing differs in having, on both the upper and under side, a narrower band extending from the costal vein across the disk beyond the cell to the first internal vein, the band being also of a creamy-white colour.

Expanse $3\frac{1}{4}$ inches.

Hab. Calcutta (*Hocking*). In coll. British Museum.

Fam. CALLIDULIDÆ.

CLEOSIRIS FASCIATA, n. sp.

Brownish-ferruginous: fore wing with a prominent yellow, irregular-bordered, transverse medial discal fascia; underside yellow, with similar red strigæ and transverse fasciæ as in *C. catamita*, the fasciæ being of a brighter red, the cell-spots red and more distinct.

Expanse $1\frac{4}{8}$ inch.

Hab. Borneo. In coll. F. Moore.

In this species both wings are much less acuminated at the angles than in *C. catamita*.

–CLEOSIRIS MAJOR, n. sp.

Allied to *C. catamita*. Of larger size than typical specimens from Java, Ceylon, and S. India. Fore wing more acutely produced at the apex. Underside of a much duller tinge of ferruginous yellow, the strigæ and transverse fascia from apex brown, the outer borders with a broad zigzag brown fascia; cell-spots dark brown.

Expanse $1\frac{6}{8}$ inch.

Hab. N. India. In coll. F. Moore.

Fam. ARCTIIDÆ.

–ALOA MARGINATA, n. sp. (Plate V. fig. 1.)

Female. Comparatively larger and with broader wings than in

A. lactinea: fore wing with narrower costal vermilion-red band; a small black spot at upper end of the cell, another at the base between upper and middle median veins, two on the submedian vein at about one third the length apart: hind wing with a moderately broad black continuous marginal band, and a large broad lunule at end of the cell. Collar and vertex vermilion; abdomen with orange-yellow and black segmental bands, of which the upper and lower black bands are broadest; side of abdomen also black; palpi beneath and fore and mid femora above vermilion; palpi above and two streaks on pectus black; femora at tip, streak down tibiæ, and bands on tarsi black.

Expanse 2¾ inches.

Hab. Nepal (*Gen. Ramsay*). In coll. F. Moore.

Fam. NOTODONTIDÆ.

The name *Corma*, which I proposed in P. Z. S. 1881, p. 326, has been previously used by Mr. Walker for a genus of Chalcosiidæ. I therefore substitute AMBADRA: the two species cited by me under *Corma* will now stand as

AMBADRA HORSFIELDII.

Eumeta horsfieldii, Moore, Catal. Lep. E.I. C. ii. p. 430 (1859).

Hab. Java.

AMBADRA RAFFLESII.

Eumeta rafflesii, Moore, Catal. Lep. E.I. C. ii. p. 430 (1859).

Hab. Java.

BARADESA, n. g.

Fore wing long, narrow, costa slightly arched, apex acute; exterior margin oblique, posterior angle convex; first subcostal emitted at nearly one half before end of the cell, second from close to the end, trifid, third thrown off at two thirds, fourth at three fifths, fifth from end of the cell and joined to second at one third its length by a short spur; upper discocellular oblique and concave at lower end, lower discocellular concave; upper radial thrown off from the fifth subcostal at one half distance beyond end of the cell and its juncture with the second subcostal, lower radial from middle of discocellulars; upper median branch from end of the cell, middle median from near the end, lower median from one third before the end; submedian curved at the base. Hind wing large, broadly triangular, costa slightly arched towards the base, apex extending beyond posterior angle of fore wing, exterior margin waved and convex in the middle, abdominal margin short; cell short; two subcostal branches on a foot-stalk beyond the cell; upper and lower discocellulars concave, radial from the angle in their middle; two upper medians from immediately beyond the cell, lower at one third before the end; submedian and internal veins straight. Body long, thorax laxly pilose; palpi ascending, second joint densely pilose in front, third joint short, thick; femora pilose beneath, tibiæ thickish and compactly pilose, fore tibiæ tufted beneath; antennæ long, finely pectinated.

BARADESA LITHOSIOIDES, n. sp. (Plate V. fig. 2.)

Male. Fore wing deep rufous-brown, indistinctly streaked with ochreous longitudinally through the cell and above the posterior margin; some black sinuous streaks across the base, and others before the middle; three or four irregular oblique series of discal spots, and a marginal row of double dots: hind wing ochreous-yellow, with a broad ochreous-brown marginal band; cilia yellow. Thorax, head, palpi, and legs rufous-brown; abdomen yellow, with a broad dorsal band on the three anal segments.

Expanse 3⅝ inches.

Hab. Darjiling. In coll. F. Moore and Dr. Staudinger.

Fam. LIPARIDÆ.

LYMANTRIA FULIGINOSA, n. sp.

Allied to *L. pusilla*, Felder (Nov. Voy. pl. 99. f. 3). *Male.* Fore wing with fuliginous-black transverse sinuous bands and spots, their interspaces ochreous-grey: hind wing dull yellowish-ochreous, with a broad, irregular-bordered fuliginous-black marginal band, this colour also indistinctly pervading the anterior border. *Female.* Fore wing with broad transverse confluent sinuous bands, their interspaces greyish white: hind wing fuliginous black, with an ill-defined whitish discal macular fascia. Thorax fuliginous in male, white in female, with a blackish frontal and central spot; abdomen ochreous, with indistinct blackish dorsal and lateral spots.

Expanse ♂ 1⅝, ♀ 2⅝ inches.

Hab. Bombay (*Dr. Leith*). In coll. F. Moore.

Genus TRISULOIDES.

Trisuloides, Butler, Ann. Nat. Hist. 1881, vii. p. 36.

TRISULOIDES CATOCALINA, n. sp.

Female. Allied to *T. sericea*, Butler. Of larger size: fore wing darker chestnut-brown, the basal area sparsely grey-speckled, crossed by a subbasal black, zigzag, pale ochreous-bordered line, a curved discal sinuous pale-bordered line, and an outer densely grey-speckled blackish sinuous-margined fascia, the outer border of the wing being slightly ochreous, and with a marginal black lunular line; an orbicular and reniform black mark: hind wing pale chestnut-brown, with a broad medial transverse ochreous-yellow band; a linear series of slender whitish lunules from anal angle. Thorax hoary, with chestnut-brown hindward tufts; abdomen brown, with dorsal chestnut-brown tufts; palpi and legs hoary. Underside dull chestnut-brown, the lower basal and discal area ochreous-yellow; apex grey-speckled: hind wing with a broad lower medial ochreous-yellow fascia, crossed by a blackish irregular line; outer area of wing grey-speckled.

Expanse 3 inches.

Hab. Darjiling. In coll. Dr. Staudinger.

Genus THAUMATOPŒA, Hübner.

Cnethocampa, Stephens.

THAUMATOPŒA CHEELA, n. sp. (Plate V. figs. 3 ♂, 3 *a* ♀.)

Male. Fore wing brownish grey, sparsely white-scaled, the scales disposed longitudinally; crossed by a basal, an antemedial, and a postmedial zigzag black line, each line being distinctly bordered by ochreous-yellow; cilia alternated with greyish white: hind wing paler. Body greyish-brown, abdomen with ochreous-yellow segmental bands; femora and tibiæ thickly clothed with long silky greyish-brown hair; tarsi and antennæ ochreous-yellow. *Female* darker brownish grey, the transverse yellow-bordered lines less distinct; thorax and abdominal tuft darker brown.

Expanse, ♂ $1\frac{2}{8}$, ♀ $1\frac{3}{8}$ inch.

Hab. Umballa district (*Captain B. Reed*). In coll. F. Moore.

Most nearly allied to the European *T. pinivora.*

Fam. LASIOCAMPIDÆ.

TARAGAMA INTENSA, n. sp. (Plate V. fig. 4.)

Male. Deep bright red: fore wing with an oblique undulated postmedial ochreous-white line, and a similar-coloured triangular spot on the costa above end of the cell: hind wing with a slight ochreous-white fascia from anal angle. Body red, head and front of thorax reddish-grey; antennæ, palpi beneath, and legs above red; cilia ochreous-white.

Expanse $1\frac{3}{4}$ inch.

Hab. N.E. Bengal (*A. E. Russell*). In coll. F. Moore.

TARAGAMA HYPERANTHERÆ, n. sp. (Plate V. fig. 5.)

Male. Dark chestnut-red: fore wing grey-specked along the costal border and broadly along exterior margin, crossed by two greyish-ochreous transverse undulated medial lines, the lower discal interspace being grey-speckled; a submarginal series of chestnut-red lunules: hind wing grey-speckled along anterior border, and with a broad greyish-ochreous fascia ascending from anal angle. Cilia of both wings greyish-ochreous. Body greyish-ochreous; tegulæ and abdominal dorsal bands dark chestnut-red; antennæ and palpi beneath also chestnut-red.

Expanse 2 inches.

Hab. Calcutta district. In coll. F. Moore.

This specimen was reared by Mr. Arthur Grote at Allipore near Calcutta, from a larva feeding, in September, on *Hyperanthera.*

Fam. CALPIDÆ.

CALPE BICOLOR, n. sp.

Fore wing of a purplish brownish-ochreous, with greyish interspaces between the browner oblique fasciæ, the line traversing the disk from the apex red, and the numerous slender strigæ distinct; some black and white speckles on the veins near the outer margin: hind wing entirely clear yellow. Thorax, palpi and fore legs above brownish-ochreous, grey-speckled; abdomen and legs yellowish. Underside yellowish-ochreous, palest on hind wing. Cilia of fore wing brown.

Expanse $2\frac{1}{8}$ inches.

Hab. Solun, Punjab (N.W. India). In coll. F. Moore.

Near to *C. ophideroides*, but very distinct. It is a third less in size, the fore wing being of an entirely different colour, and is marked similarly to *C. minuticornis* and its allies.

CALPE MINUTICORNIS.

Calpe minuticornis, Guén. Noct. ii. p. 374.

Nearest allied to *C. thalactri*, but is a smaller insect; fore wing browner in colour and with grey-washed interspaces between the oblique fasciæ; the hind wing is also darker, and has a perceptibly darker outer margin; underside of fore wing uniformly pale dusky brownish-ochreous throughout, and the hind wing has a more decidedly darker marginal border.

Expanse $1\frac{6}{8}$ inch.

Hab. India (Bombay, Darjiling); Ceylon; ? Java.

Fam. GONOPTERIDÆ.

GONITIS FULVIDA.

Anomis fulvida, Guénée, Noct. ii. p. 397 (1852), ♀.

Gonitis guttanivis, Walker, Catal. Lep. Het. B. M. xiii. p. 1003 (1857), ♂.

Male. Fore wing ochreous-red, covered with numerous ochreous-yellow scales; crossed by a purple-black oblique waved antemedial line and a medial line, the latter bent outward below the reniform mark and thence zigzag upward to the costa; an indistinct dusky zigzag submarginal fascia; the veins outward from the medial line speckled with purple-black and grey; a prominent white orbicular spot, and an oval spot bordering the lower end of the dusky grey reniform mark: hind wing pale ochreous-brown. Cilia edged with white. Thorax and head reddish ochreous; abdomen, palpi, and legs ochreous-brown.

Female paler; fore wing with the transverse lines more slender and less distinct, the antemedial and lower part of the medial line angular; orbicular white spot very minute; reniform indistinct and not white at lower end; veins externally less distinctly speckled.

Expanse $1\frac{1}{2}$ to $1\frac{3}{4}$ inch.

Hab. India (Darjiling, Khasia hills, Canara); Ceylon; Java.

ARTHISMA, n. g.

Male. Fore wing elongated, somewhat narrow, apex acute; exterior margin oblique and angular in the middle, posterior margin angular near the base; costal vein extending two thirds the margin; first subcostal emitted at half length of the cell, second at one eighth, trifurcate, the third being thrown off at one sixth from base of second, and the fourth close to apex at one eighth from base of third, fifth from end of the cell and slightly touching third near its base; cell long, rather broad; discocellular slightly bent near both ends, radials from the angles; upper median from above end of the cell, middle median from the end, and lower at one half before the end; submedian slightly concave near the base. Hind wing short; anterior margin much arched at the base; exterior margin very oblique, scalloped, and deeply cleft between the lower median and submedian veins, the cilia fringing the margin on both sides to the end of the incision; abdominal margin long; subcostal vein looped to costal at its base; cell very short, less than one third he wing; two subcostal branches from end of the cell; discocellular concave, slightly bent near its lower end; radial from the angle; two upper medians at one fourth beyond end of the cell, lower median at one half before the end; submedian much undulated; internal slightly recurved, and apparently with a short second inner veinlet lobed to it near the base. Body moderately slender, abdomen long; palpi long, slender, ascending, second joint projecting above the vertex, third slender and nearly of equal length to second; legs slender; antennæ very finely pectinated.

ARTHISMA SCISSURALIS.

Male. Dull ochreous-red: fore wing with an outwardly oblique subbasal very indistinct yellowish lunular band, a recurved discal similar band composed of broader lunules, and an outer submarginal zigzag less distinct and narrower band, a yellowish slender discocellular lunule, and a minute white orbicular spot; hind wing with an indistinctly paler medial fascia. Cilia edged with ochreous-white. Body and palpi ochreous-red; legs darker red above, fore legs with white tibial streak and tarsal bands.

Expanse $1\frac{4}{10}$ inch.

Hab. Singapore. In coll. F. Moore.

RUSICADA ALBITIBIA.

Gonitis albitibia, Walker, Catal. Lep. Het. B. M. xiii. p. 1001 ♀.

Rusicada nigritarsis, Walker, *l. c.* p. 1006, ♂.

Male. Fore wing dark purplish reddish-ochreous, palest and blotchy on posterior border; crossed by a darker oblique zigzag antemedial and a medial line, the latter bent below the reniform mark, and thence sinuous upward to the costa; a less distinct submarginal dark zigzag slender fascia; an indistinct minute white orbicular spot and a grey lobed reniform mark; cilia purplish-brown:

hind wing pale brown; cilia edged with cinereous white. *Female* paler coloured, marked as in male. Thorax, head, palpi, and legs above dark reddish-ochreous; tarsi with pale bands, tibial tuft in female white externally.

Expanse, ♂ $1\frac{3}{10}$, ♀ $1\frac{7}{10}$ inch.

Hab. Ceylon (*Mackwood*); Calcutta and Darjiling (*Atkinson*). In coll. F. Moore.

RUSICADA DIVERSALIS, n. sp.

Male. Fore wing purplish reddish-ochreous, of a uniform tint throughout the wing; crossed by a very indistinct darker waved antemedial line, and a slightly more distinct grey-bordered lunular postmedial zigzag line, beyond which is a distinct submarginal series of black-pointed spots; minute pale orbicular and reniform dots very indistinct; cilia edged with black: hind wing dusky brown, darkest along the outer border; cilia reddish-ochreous, edged with paler ochreous. Thorax, head, palpi and legs above reddish-ochreous; tarsi with pale bands; antennæ very minutely pectinated.

Expanse $1\frac{4}{12}$ inch.

Hab. Singapore. In coll. F. Moore.

Allied to *Gonitis brunnea*, which has similar markings on fore wing, but the antennæ are deeply pectinated.

GONITIS METAXANTHA.

Gonitis metaxantha, Walker, Catal. Lep. Het. B. M. xiii. p. 1005 (1857).

Fore wing ochreous-red, numerously covered with ochreous-yellow scales; crossed by a deeper red angular antemedial and a zigzag discal line, and a pale-bordered dusky submarginal zigzag fascia; veins externally grey-speckled; a yellowish blotch bordering the medial line below the cell, this blotch being less distinct in the female; a very minute grey-white orbicular dot, and an indistinct dusky-grey reniform mark, the upper part of the latter being nearly obsolete: hind wing dusky ochreous-brown. Cilia edged with ochreous-white. Thorax, head, palpi, and legs ochreous-red; abdomen brown.

Expanse $1\frac{1}{2}$ to $1\frac{3}{4}$ inch.

Hab. Cherra Punji; Darjiling (*Atkinson*).

GONITIS TRILINEATA, n. sp. (Plate VI. fig. 1.)

Fore wing purplish red, numerously covered with minute whitish-ochreous scales, which are most dense along the costal border; crossed by a whitish ochreous outwardly-oblique basal line, a subbasal narrower, nearly straight line, and a medial line, which is curved outward from below end of the cell and then ascends the disk to the costa, being also angled on the upper median and lower subcostal veins; a less distinct submarginal lunular zigzag line; a pale discocellular line from angle of medial transverse line; a very small white orbicular spot; cilia red; veins externally lined with ochreous and black speckles: hind wing and abdomen pale brownish ochreous; cilia whitish; thorax, palpi, and legs above purplish red.

Expanse $1\frac{3}{8}$ inch.

Hab. Bombay. In coll. F. Moore.

Genus THALATTA, Walker.

Thalatta, Walker, Catal. Lep. Het. B. M. xiii. p. 996.

—THALATTA ALBIORBIS, n. sp.

Fore wing dark purplish brown, crossed by a postmedial indistinct outwardly-oblique waved brown line; a prominent pure-white orbicular spot: hind wing greyish brown; cilia white. Underside purplish greyish brown; hind wing brown-speckled. Palpi and legs dark purple-brown.

Expanse $1\frac{2}{10}$ inch.

Hab. Ceylon. In coll. F. Moore.

Allied to *T. præcedens*, Walker.

—THALATTA MODESTA, n. sp.

Fore wing greyish purple-brown, crossed by a postmedial indistinct pale-bordered brown line; hind wing cinereous-brown. Body, palpi, and legs brown.

Expanse $1\frac{2}{10}$ inch.

Hab. Ceylon. In coll. F. M. Mackwood.

Fam. TOXOCAMPIDÆ.

—APOPESTES INDICA, Moore.

Upperside—fore wing with basal two thirds brownish-grey, showing but very few indistinct short blackish strigæ, these appearing only contiguous to and beyond a transverse row of short longitudinal submarginal streaks; reniform mark blackish with grey-white border; a white dot in middle of cell; a series of blackish spots on costa; a prominent black lunular marginal line: hind wing pale brown. Body brown; palpi and tarsi black-speckled. Underside glossy pale greyish brown; a narrow transverse discal and submarginal streak and a short discocellular streak dusky brown.

Expanse $2\frac{1}{8}$ inches.

Hab. Manpuri, N.W. Provinces (*C. Horne*). In coll. F. Moore.

Has much the aspect of *Ophiodes trapezium*, and is allied to *A. phantasma* from the Altai; but differs in having narrower wings, and in the absence of the distinct mottling and medial transverse wavy bands on fore wing of the latter species.

Fam. POLYDESMIDÆ.

Genus DONDA.

—*Donda*, Moore, Desc. Lep. Coll. Atkinson, Asiat. Soc. Bengal, p. 161 (1882).

Fore wing elongated, less triangular than in *Oromena*; hind wing somewhat shorter, exterior margin more convex; venation similar.

Body stouter; palpi compactly clothed, terminal joint more slender; antennæ simple in both sexes. Allied to *Belciana*.

DONDA EURYCHLORA.

Daudaca eurychlora, Walk. Catal. Lep. Het. B. M. p. 1670.

Hab. Canara (*Ward*); Darjiling (*Atkinson*).

DONDA STRIATOVIRENS, n. sp. (Plate VI. fig. 2.)

Female. Fore wing blackish cupreous-brown, crossed by a basal, an ante- and postmedial, and a submarginal olive-green sinuous-bordered bands, which are traversed by black sinuous lines; reniform mark green, and shaped like a letter K; a marginal row of green-bordered black cordate spots; the interspaces between the transverse bands also more or less green-speckled: hind wing cupreous-brown, with a marginal row of small green-bordered blackish lunules ending in two streaks at the anal end. Thorax, palpi, and legs cupreous-brown; thorax and fore tibiæ above green-speckled; legs with pale bands.

Expanse $2\frac{3}{8}$ inches.

Hab. Cherra Punjee (*Austen*). In coll. F. Moore.

DONDA ORNATA, n. sp. (Plate VI. fig. 3.)

Female. Fore wing dark cupreous-brown, crossed by a basal, an antemedial, and a postmedial black-bordered olive-grey-speckled lunulated bands, the two former confluently grey-speckled along posterior border; an olive-grey-speckled lunulated patch on the middle of exterior border, and some lunulate streaks ascending to apex; a small white orbicular spot, and a prominent white-lined reniform mark; the medial area between the transverse lines black-speckled: hind wing ænescent yellow, with a broad even-bordered cupreous-brown marginal band, with a slight white sinuous streak from anal angle. Thorax, head, palpi, and legs above chestnut-brown; palpi and legs with yellowish bands; abdomen ænescent yellow, with slight blackish dorsal tufts.

Expanse ♀ $1\frac{6}{8}$ inch.

Hab. Bombay. In coll. F. Moore.

Genus PANDESMA, Guén.

Syn. *Cerbia*, Walker.

PANDESMA ANYSA.

Pandesma anysa, Guén. Noct. ii. p. 439 (1852).

Cerbia fugitiva, Walker, Catal. Lep. Het. B. M. xiv. p. 1365.

Male and Female. Differ from *P. quenavadi* in their smaller size and paler grey colour; fore wing with similar transverse markings, which stand out regularly: hind wing with a narrower, paler, and more visibly transverse streaked outer fascia. Underside whiter, with much less distinct and narrower outer band.

Expanse $1\frac{5}{10}$ inch.

Hab. N.W. India (Rawul Pindee); Bombay. In coll. F. Moore.

PANDESMA SIMILATA, n. sp.

Smaller than *P. anysa*. Fore wing brownish grey, densely speckled; markings similar, distinctly formed but less visibly separated: hind wing with browner outer band. Underside white, with more prominent outer band than in *P. anysa*.

Expanse $1\frac{2}{10}$ inch.

Hab. N.W. India (Rawul Pindee; Allahabad). In coll. F. Moore.

Fam. CATEPHIIDÆ.

ERCHEIA PANNOSA, n. sp.

Allied to *E. costipannosa*. Fore wing comparatively shorter and broader, and of a pale ochreous tint. *Male* with the costal patches darker, the basal less sinuous, the apical shorter, the transverse double line less distinct, the discocellular or reniform mark elongated, and either white or white-bordered, the mark below the cell shorter: hind wing similarly marked. *Female* with black patches and less distinct transverse lines.

Expanse, ♂ $1\frac{6}{8}$, ♀ 2 inches.

Hab. S. India (Malabar); Ceylon. In coll. F. Moore.

ERCHEIA UNIFORMIS, n. sp.

Male and Female. Fore wing of a more uniform brown colour, darkest along the costal area; the transverse sinuous lines more distinct than in *E. pannosa*; the reniform mark whitish-lined, and two small black-lined marks below it, the mark between the median and submedian veins very small.

Expanse, ♂ $1\frac{5}{8}$, ♀ $1\frac{7}{8}$ inch.

Hab. S. India (Malabar). In coll. F. Moore.

Fam. EREBIIDÆ.

SYPNA CONTELLATA, n. sp.

Fore wing dark umber-brown, with four transverse equidistant linear series of pure-white spots and numerous very minute intervening dots, and a floreate cluster of white spots forming the reniform mark: hind wing paler brown, with paler medial and submarginal fasciæ, and a lower marginal row of pure-white spots. Underside very pale brownish-ochreous, with a narrow inner and broad outer dusky-brown band, the latter traversed by a waved pale line.

Expanse $2\frac{3}{8}$ inches.

Hab. Dharmsala (*B. Powell*). In coll. F. Moore.

SYPNA RUBRIFASCIA, n. sp.

Intermediate between *S. fraterna* and *S. curvilinea*. Darker in colour than either, the fore wings comparatively narrower than in *S. curvilinea*; the interspace between the medial transverse lines wider and distinctly divided by pale vein-lines; the postmedial fascia brighter coloured; the marginal spots are prominently blue-speckled: hind wing with less distinct pale fasciæ, and the margin with a blue lunular line. Underside with less-defined fasciæ.

Expanse $2\frac{1}{8}$ inches.

Hab. Darjiling. In coll. British Museum.

SYPNA PRUNOSA, n. sp.

Male. Allied to *S. moorei.* Dark purplish brown; fore wing with similar transverse band, except that its outer border is irregular and encompasses the entire reniform mark: hind wing with two pale zigzag fasciæ, the lower being nearer the margin; the marginal lunules distinct and bordered with bluish-grey.

Expanse $2\frac{2}{8}$ inches.

Hab. Darjiling. In coll. F. Moore.

SPYNA FRATERNA, n. sp.

Allied to *S. curvilinea*; comparatively smaller. Fore wing with the broad medial band of a uniform dark-brown colour throughout, its inner-bordered duplex line indistinctly ochreous, and the outer line bright ochreous; the discal area broadly, and an apical patch also bright ochreous; a minute white orbicular dot, and a slender indistinctly defined reniform mark: underside of a brighter and paler ochreous tint, with a narrower and more recurved transverse inner dusky fascia, and comparatively broader outer fascia.

Expanse 2 inches.

Hab. Darjiling. In coll. F. Moore and British Museum.

SYPNA RENISIGNA, n. sp.

Male. Dark purplish brown. Fore wing crossed by a broad subbasal and antemedial blackish band, bordered outwardly by a slender duplex black line extending irregularly outward beyond the cell and terminating on the costa above the end; a submarginal blackish zigzag narrow band, and a marginal row of slender ochreous-bordered black lunules; a distinct white minute orbicular dot and large prominent reniform mark: hind wing with a blackish subbasal and a discal suffused band, and a marginal row of slender pale-bordered lunules. Underside pale brownish ochreous: fore wing with three distinct medial transverse narrow black bands; hind wing with a narrow medial and a broad discal band.

Expanse $1\frac{6}{8}$ inch.

Hab. Khasia hills. In coll. F. Moore.

ARGIVA STRIGIPENNIS, n. sp.

Allied to *A. hieroglyphica*; smaller in size. Both sexes pale ochreous-brown, much paler than the female of *A. hieroglyphica.* Upperside with more delicate short strigæ, which are sparsely disposed between the three transverse irregular darker brown fasciæ; the fasciæ in both sexes (especially in the male) showing more prominently than in female *A. hieroglyphica*; the oblique short subapical band at upper outer end of the medial fascia, in both sexes, is brownish-ochreous, and the zigzag outer margin of the medial fascia also slenderly bordered by brownish-ochreous; lobate reniform mark half the size of that in *A. hieroglyphica*, and not darker than the fasciæ. Underside ochreous-brown, the marginal borders paler, the short oblique subapical band and ill-defined interrupted slender sinuous fascia ochreous-white.

Expanse, ♂ $2\frac{5}{8}$, ♀ $2\frac{6}{8}$ inches.

Hab. Khasia hills (*Austen*). In coll. F. Moore.

NYCTIPAO PRUNOSA, n. sp.

Allied to *N. glaucopis*. Smaller; colour of a bluer glossy iron-grey purplish-brown tint; fore wing with a smaller retort mark, the transverse pale zigzag line linear, not composed of distinct lunate spots as in *N. glaucopis*; hind wing with smaller white subapical spots, the second spot being lunate; on the underside the transverse series of spots are also much smaller and linear.

Expanse $3\frac{1}{2}$ inches.

Hab. Kussowlie, N.W. Himalaya. In coll. F. Moore.

Fam. OMMATOPHORIDÆ.

SERICIA CALAMISTRATA, n. sp.

Allied to *S. substruens* (*Tavia substruens*, Walk.).

Markings on both wings similar, except that in the fore wing the prominent discal white-speckled mark beyond the cell is formed by a uniformly rounded duplex line, with a more slender lower terminal inner end, and with its upper costal end more acutely sinuous.

Expanse $2\frac{1}{2}$ inches.

Hab. Andaman Isles. In coll. F. Moore.

Fam. HYPOPYRIDÆ.

HYPOPYRA PALLIDA, n. sp.

Male. Similar to *H. vespertilio*. Much paler in colour: fore wing with the subbasal transverse fascia less curved; oblique medial lines darker, the contiguous and outer sinuous fasciæ more distinct, and the marginal lunular line less defined; three prominent small black spots encircled by greyish-white, and an indistinct discocellular lunule: hind wing with two distinct brown medial lines and two contiguous lines, two distinct outer sinuous fasciæ, and a marginal lunular brown line.

Female. Much paler than the same sex of *H. vespertilio*; the markings indistinct: fore wing with three small indistinct black-centred grey-bordered spots, and slender discocellular lunule.

Expanse, ♂ $2\frac{3}{4}$, ♀ 3 inches.

Hab. Ceylon. In coll. F. Moore.

Fam. OPHIUSIDÆ.

NAXIA DUPLEXA, n. sp. (Plate VI. fig. 4.)

Near to *N. calefaciens*. *Female.* Fore wing differs in the subbasal line being curved inward and slenderly bordered on each side by a lilac-purple line, and the discal line being much less acutely sinuous, the intermediate lilac fascia more erect, not dark-bordered on its outer margin, and not being suffused to the discal line; orbicular spot small and white: hind wing uniformly ochreous-brown.

Expanse $2\frac{1}{10}$ inches.

Hab. Darjiling. In coll. F. Moore.

OPHIUSA ACUTA, n. sp. (Plate VI. fig. 5.)

Allied to *O. falcata*, Moore (Desc. Lep. Coll. Atk. p. 171, 1882). Fore wing differs in the duplex subbasal line being more erect and not recurved, the pale lilac fascia narrower, the discal curved line nearer the extreme margin, thus making the dark-brown interspace much wider, its angle near the costa is also much more acute, and the line from the angle curved upward to the apex; hind wing darker.

Expanse 2 inches.

Hab. Khasia hills (*Austen*). In coll. F. Moore.

Fam. THERMESIIDÆ.

DURDARA FENESTRATA, n. sp. (Plate VI. fig. 6.)

Red; both wings crossed by several linearly disposed delicate black strigæ: fore wing with a lower discal black-bordered trilobate spot, the upper and lower lobes being diaphanous white, the middle lobe broken and slightly yellowish; a slight dusky spot at end of the cell: hind wing also with a slight dusky spot at end of the cell. Underside duller red, marked as above, the fore wing also with a slight short fascia below the apex.

Expanse $1\frac{1}{4}$ inch.

Hab. Bombay (*Wilkinson*). In coll. F. Moore.

SONAGARA BIVITTATA, n. sp. (Plate VI. fig. 7.)

Allied to *S. decussata*, one third less in size. Both wings crossed by numerous linearly-disposed black strigæ, which, across the wings and along the outer border, are darker and form two distinct darker bands. On the underside these strigose bands are also present.

Expanse $\frac{8}{10}$ inch.

Hab. Andaman Isles. In coll. F. Moore.

SONAGARA DECUSSATA, n. sp. (Plate VI. fig. 8.)

Pale dull yellowish-ochreous; both wings crossed by numerous short black strigæ, which assume the letter X here and there between the outer veins; a small quadrate black discocellular spot on both wings.

Expanse $1\frac{1}{4}$ inch.

Hab. N.E. Himalaya (*Farr*). In coll. F. Moore.

SONAGARA VIALIS, n. sp. (Plate VI. fig. 9.)

Male. Allied to *S. strigipennis*. Differs in the narrow band from the apex of fore wing to middle of abdominal margin being more prominent, the delicate transverse strigæ also more distinct; the fore wing not having the outer line from the band to posterior angle; and this outer line on the hind wing, instead of terminating above the anal angle, extends to near middle of the exterior margin; the fore wing also has a large blackish discocellular spot. Underside marked as above.

Expanse $1\frac{6}{10}$ inch.

Hab. Himalaya (*Capt. Magee*). In coll. F. Moore.

CAPNODES STELLATA, n. sp.

Upperside dull ochreous-red; fore wing crossed by an antemedial and a postmedial zigzag black-speckled white-spotted line, terminating in a more prominent white spot on the costa, with a brighter red zigzag fascia between them, and a submarginal double fascia; a white spot also at base of wing, and a marginal row of black dots: hind wing with a medial transverse zigzag black-speckled white-spotted line, with less distinct intervening zigzag fasciæ, and a marginal row of dots. Underside uniform dull umber-brown.

Expanse $1\frac{8}{10}$ inch.

Hab. Singapore. In coll. F. Moore.

Fam. FOCILLIDÆ.

—**ACHARYA COSTALIS**, n. sp. (Plate VI. fig. 10.)

Chestnut-brown, brightest on the basal area; both wings with a blackish medial transverse fascia, a discal sinuous white-pointed black line, a submarginal narrow ochreous line, with slender ochreous streaks from the line to the exterior margin, and intervening black dot between each vein: fore wing with a broad ochreous-black-speckled costal band, the submarginal line angled in the middle, a white orbicular spot, and a white-speckled reniform mark. Underside uniform pale brown, with indistinct transverse dusky sinuous line and discocellular spot. Body chestnut-brown; middle of thorax ochreous; palpi bright ochreous.

Expanse $1\frac{1}{2}$ inch.

Hab. Andaman Isles. In coll. F. Moore.

Fam. HYPENIDÆ.

BYTURNA, n. g.

Wings very small: fore wing narrow, elongated; costa straight, apex acute, exterior margin slightly convex; costal vein long, extending to two thirds the margin; first subcostal branch emitted at one half, and second at one fourth before end of the cell, second trifurcate, the third being thrown off at three fourths, and fourth from one fourth beyond the base, fifth from end of the cell and looped to fourth close to its base; discocellulars bent at near their upper and lower ends; upper very short, lower very concave, slender; upper radial from angle at end of the cell, lower radial from angle above lower end of the cell; upper median branch from angle at lower end of the cell, second branch at one eighth and third at one third before its end; submedian straight. Hind wing elongated oval; costal vein straight, extending to apex; two subcostal branches from end of the cell; discocellulars concave, upper longest; radial from their middle; two upper medians from beyond end of the cell, lower at one fourth before its end; submedian and internal vein straight. Body stout; palpi long, ascending, second joint squamose, laterally broadest at the apex, extending to a level with the vertex, third joint slender, naked, about half length of second; antennæ finely setose; legs squamose, fore tibiæ tufted beneath.

This genus has much the appearance of *Rivula*.

BYTURNA DIGRAMMA.

Bocana digramma, Walker, Catal. Lep. Het. B. M., Suppl. p. 1170.

Hab. India; Ceylon.

PASIRA BIATOMEA, n. sp.

Male. Pale ochreous: fore wing with two minute black discocellular spots, another spot above the submedian vein, and a marginal row of still smaller dots, the apical dot most prominent: hind wing with indistinct brownish-ochreous outer border. Underside brighter coloured: hind wing brown-speckled along the costal border and apex, with a blackish discocellular streak and a marginal row of small dentate spots.

Expanse 1 inch.

Hab. Ceylon. In coll. F. Moore.

A larger species than *P. ochracea* from Calcutta.

Fam. PYRALIDÆ.

LEUCINODES DISCISIGNA, n. sp.

Ochreous-white: fore wing with a short basal and three middle transverse ochreous-brown bands, the outer band bordered by a slender black lunular line; a submarginal sinuous white line, bordered inwardly by black at its apical and posterior end; a prominent white S-shaped discocellular spot; hind wing with a slight submarginal and discal sinuous brown line.

Expanse 1 inch.

Hab. Darjiling. In coll. Dr. Staudinger and F. Moore.

EUDOREA LATIVITTA, n. sp.

Fore wing ochreous-white, with a short basal brown streak, a broad medial transverse angular bordered band, and a submarginal sinuous fascia, the interspaces brown-speckled; two black dots at end of the cell, and a row on submargin: hind wing cinereous-white.

Expanse $\frac{6}{8}$ inch.

Hab. Darjiling. In coll. Dr. Staudinger and F. Moore.

EXPLANATION OF THE PLATES.

PLATE V.

Fig. 1. *Aloa marginata*, n. sp., p. 15.
2. *Baradesa lithosioides*, n. sp., p. 17.
3, 3 *a*. *Thaumatopœa cheela*, n. sp., p. 18.
4. *Taragama intensa*, n. sp., p. 18.
5. —— *hyperantheræ*, n. sp., p. 18.

PLATE VI.

Fig. 1. *Gonitis trilineata*, n. sp., p. 21.
2. *Donda striatovirens*, n. sp., p. 23.
3. —— *ornata*, n. sp., p. 23.
4. *Naxia duplexa*, n. sp., p. 26.
5. *Ophiusa acuta*, n. sp., p. 27.
6. *Durdara fenestrata*, n. sp., p. 27.
7. *Sonagara bivittata*, n. sp., p. 27.
8. —— *decussata*, n. sp., p. 27.
9. —— *vialis*, n. sp., p. 27.
10. *Acharya costalis*, n. sp., p. 28.

4. Descriptions of Five new Species of Shells.

By G. B. SOWERBY, Jun.

[Received January 8, 1883.]

(Plate VII.)

LIMA GOLIATH, sp. n. (Plate VII. fig. 3.)

Shell rather obliquely oval, white, semitransparent, striated at the sides and on the auricles, otherwise smooth; anterior side with a depressed lunule, making a straight outline extending from the umbones about half the length of the shell; thence the outline is curved; umbones acute; cardinal area deeply excavated; anterior auricles small and very sloping, posterior large; valves nearly closed on the hinder side, slightly gaping in front.

Long. 150, lat. 110 mill.

Hab. Japan.

This magnificent species, the largest of the genus, appears to have been hitherto undescribed. It is of stouter substance and not so inflated as the Norwegian species (*L. excavata*). Its surface is smooth, excepting at the sides, which are rather roughly striated. The cardinal area is larger and deeper than in the specimens before me of *L. excavata*.

This specimen was sent to me from Japan, and now belongs to the rich collection of Dr. Prevost, of Alençon. Another specimen has recently been brought by Dr. Hungerford from Japan, the latter being a very old shell, larger and thicker than the type, with its surface much eroded and worm-eaten.

THRACIA JACKSONENSIS, sp. n. (Plate VII. fig. 5.)

Shell obliquely oval, white, covered with a very thin pale epidermis, rather thin, inequilateral, umbones posterior; both valves faintly irregularly wrinkled with concentric striæ; dorsal margin posteriorly sloping to an angle; anterior side arched, and obliquely sloping towards the ventral margin; posterior obliquely truncated; ventral margin very slightly arched; umbonal ridge obtusely angulate; hinge with cartilage-processes rather small.

Long. 35, alt. 26, lat. 13 mill.

Hab. Port Jackson (*Brazier*).

Another interesting species of the genus *Thracia* from the same locality as the one described by Mr. Angus in the 'Proceedings' of 1869, and discovered by the same persevering and intelligent collector.

TELLINA BRAZIERI, sp. n. (Plate VII. fig. 2.)

Shell transversely ovate, nearly equilateral, moderately thin, dull yellowish white, without markings; concentrically laminated, laminæ very fine and thread-like; umbones acute, rather prominent, approximate; anterior side rounded, posterior truncated; anterior dorsal margin incurved, posterior sloping in a straight line to form an angle with the side; ventral margin arcuate; dorsal area slightly depressed; ligament long and narrow.

Long. 8, alt. 7, lat. 2 mill.

Hab. Port Jackson (*Brazier*).

A remarkable little species having the form and external appearance of an *Amphidesma*.

TELLINA MODESTA, sp. n. (Plate VII. fig. 1.)

Shell transversely ovate, rather inequilateral, compressed, thin, white, shining; concentrically very finely striated; anterior side rounded, posterior slightly flexuous; dorsal margins sloping; ventral margin strongly arcuate; umbones small, approximate; dorsal area very slightly impressed; ligament moderate.

Long. 12, alt. 9, lat. 3 mill.

Hab. Port Jackson (*Brazier*).

A delicate shining white shell of very simple character.

PECTUNCULUS ROBUSTUS, sp. n. (Plate VII. fig. 4.)

Shell suborbicular, solid, subequilateral, very pale yellowish brown, here and there sparingly banded and spotted with darker brown; anterior side rounded, posterior angulated, slightly incurved and depressed above the angle; dorsal margin straight; ligamentary area narrow; umbones rather acute; valves radiately ribbed (ribs prominent, rounded, close-set, about 23 in number, much narrower above the angle), concentrically striated; striæ thread-like, crossing ribs and interstices.

Long. 40, alt. 37, lat. 22 mill.

Hab. ——?

A very distinct and characteristic species.

EXPLANATION OF PLATE VII.

Fig. 1. *Tellina modesta*, p. 31.
2. —— *brazieri*, p. 31.
3. *Lima goliath*, p. 30.
4. *Pectunculus robustus*, p. 31.
5. *Thracia jacksonensis*, p. 30.

February 6, 1883.

Prof. Flower, LL.D., F.R.S., President, in the Chair.

The Secretary read the following report on the additions made to the Society's Menagerie during the month of January 1883:—

The total number of registered additions to the Society's Menagerie during the month of January was 79, of which 2 were by birth, 38 by presentation, 37 by purchase, and 2 were received on deposit. The total number of departures during the same period, by death and removals, was 126.

Amongst the additions during the month attention was called to examples of two species of Passerine Birds from Japan new to the collection—the Grey Thrush (*Turdus cardis*), and the Red-sided Titmouse (*Parus varius*).

The Secretary read an extract from a letter from Mr. F. C. Selous, dated "Umklangen, Matabele Country, November 7, 1882," stating, in reply to inquiries, that he was afraid that the chance of getting a living White Rhinoceros (*Rhinoceros simus*) was now very small. The very few of these animals that still survived were almost entirely restricted to the "fly"-infested districts. Mr. Selous had been trying to get an adult male specimen of this animal for the British Museum for a whole year, and had not succeeded, not having seen one at all, but intended to try again this year on the river Sabi. As to other animals, he could get living specimens of the Sable and Roan Antelopes, Blue Wildebeest, Tsessebe Antelope, and Eland. The Elands of the Mashuna country were of the striped variety (*Oreas livingstoni*). They were most of them very plainly striped, and had black patches on the inside of the forearm. Another animal Mr. Selous could get specimens of was the Warthog, and also the beautifully striped northern variety of Burchell's Zebra (*Equus chapmani* of Baines).

The Secretary read the following extracts from a letter received from the Rev. G. H. R. Fisk, C.M.Z.S., dated "Capetown, Nov. 28, 1882":—

"The following notes were made by me as the events took place; and I think they tend to show two ways, amongst many, in which the naturally large and rapid increase of Snakes is kept within comparatively moderate limits.

"A specimen of *Saurophis crucifer*, which I had in captivity, laid four eggs from $\frac{5}{8}$ and $\frac{1}{16}$ to an inch long.

"Another Snake in the same box (probably a young *Coronella cana*) seized and swallowed one of the eggs; then *C. cana* seized *S. crucifer* across the lower part of the body, as if to hasten the presentation of another egg. My presence seemed to cause it to desist. After this the *Coronella cana* discovered another egg, which it ate. A quarter of an hour after this *C. cana* seized *S. crucifer* across the middle of the body, and dragged and turned her so as to expose the underneath portion; then desisting, it swallowed the remaining two eggs; then it again seized the *S. crucifer* about the middle, and pressed it between its jaws forcibly and progressively downwards toward the tail for three or four inches. After this *C. cana* searched through the sand in the box, turning it up in every direction as if seeking for more of its desired food. It seized *S. crucifer* several times in the same manner, sometimes raising it two inches from the sand and dragging it. After this treatment of the one Snake by the other had continued about two hours, I removed the *S. crucifer* into another box.

"It appears also that Lizards destroy Snakes. A young example of *S. crucifer* and a Lizard (of which I forget the name just now) were in a box together. Neither interfered with the other for two or three days. One day when I was looking at them, the Lizard attacked the Snake. It touched it in various places with its tongue, trod upon it, attacked it, so as to cause it to turn about, as if in pain and greatly frightened. After this process had continued for some minutes, the Lizard bit the Snake in the side about one third of its length from the head, and the Snake immediately gave signs of dying. I took it out of the box, as I wished to examine its teeth; and on opening its mouth, it partially recovered in my hands, and lived for three or four hours, when it died. It is now in the South-African Museum, placed in spirit so as to exhibit the wound in the side. The Lizard having died also some time after, was also placed in the museum. A native from the central part of the Colony has since told me that there are Lizards which will attack and kill Snakes even if a yard long. But this statement, until established, should be taken *cum grano.*"

The following papers were read :—

1. On a third Species of *Otidiphaps*.

By O. Salvin and F. D. Godman.

[Received February 5, 1883.]

In a small collection of birds recently sent us by Mr. Andrew Goldie from the Dentrecasteaux Islands, near the extreme eastern end of New Guinea, are two specimens of an *Otidiphaps* belonging to a species quite distinct from both *O. nobilis* of North-western New Guinea, and *O. cervicalis* of the south-eastern ranges of the great island. The absence of any spot on the nape, the pure cinnamon of the back and wings, and the different colour of the lower back and rump render it at once distinguishable from either of its congeners.

We propose to describe it as follows:—

OTIDIPHAPS INSULARIS, sp. nov.

Capite toto, cervice et corpore subtus nigris purpurascente tinctis; interscapulio, secundariis et tectricibus alarum omnibus pure cinnamomeis; remigibus fuscis; cauda nigra; dorso postico viridescenti-nigro, dorso imo et uropygio pupurascente tinctis; rostro corallino-rubro; pedibus vinaceo-rubris, flavo squamulatis. Long. tota 15·0, *alæ* 7·4, *caudæ rectr. mediis* 6·6, *rectr. lat.* 3·3, *rostri a rictu* 1·15, *tarsi* 2·6 *poll. Angl.*

Hab. Insula Fergusson dicta, ad oras Novæ Guineæ orientalis (*Goldie*).

Obs. Ab *O. nobili* crista occipitali et macula nuchali absentibus, colore dorsi purius cinnamomeo nec purpureo tincto, colore dorsi postici viridescente nec omnino purpureo, et cauda breviore diversus. Ab *O. cervicali* macula nuchali absente, colore dorsi purius cinnamomeo nec purpureo tincto et colore dorsi imi et uropygii purpureo distinguendus.

Mr. Goldie writes that he obtained the two specimens of this Pigeon on an exceedingly rough range of mountains at an altitude of over 2000 feet on Fergusson Island, one of the Dentrecasteaux group. The call, he says, is a sort of ké-o, the "o" being prolonged. One bird was shot on a low limb of a large tree. He adds that the iris is red, and the legs claret-colour with the scales of light greenish yellow.

The two previously known other species of *Otidiphaps* have recently been described, and a full account given of them, by Count Salvadori in the third part of his 'Ornitologia della Papuasia e delle Molucche,' pp. 188–191. The discovery of a third species of this remarkable genus is of great interest, and does credit to Mr. Goldie's industry.

It was on the same island that the Bird of Paradise which we have recently described (Ibis 1883, p. 131) as *Paradisea decora* was obtained.

2. Further Notes on *Tragelaphus gratus*. By P. L. SCLATER, M.A., Ph.D., F.R.S., Secretary to the Society.

[Received February 1, 1883.]

(Plate VIII.)

At the meeting of this Society held on the 15th of June 1880, I exhibited a skin of an Antelope from the Gaboon, which I referred to an undescribed species of *Tragelaphus* allied to *Tr. spekii*, and proposed to call *Tragelaphus gratus*[1]. I have now the pleasure of being able to give some further information respecting this interesting animal.

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[1] See P. Z. S. 1880, p. 452, pl. xliv.

stituting the subgenus *Hydrotragus* of Gray[1]. From *Tragelaphus spekii* the present Antelope is at once distinguishable by the transverse white markings of the body and the white spots on the head and chest. In *Tr. spekii* the adult animal (of which, so far as I know, there is no specimen in this country) is of a uniform greyish brown, and altogether devoid of either stripes or "spots"[2].

3. Supplementary Notes on the Birds of the Argentine Republic. By E. W. White, F.Z.S. With Remarks by P. L. Sclater, M.A., Ph.D., F.R.S.

[Received January 17, 1883.]

(Plate IX.)

These notes relate to species of birds not included in my former paper on this subject[3], and principally to those obtained during a recent visit to Cosquin, a village about thirty miles from Cordova, described in my 'Cameos from the Silverland,' I. ch. xv.

[I have examined skins of most of these species in a collection just received from Mr. White by Mr. E. Gerrard, jun. Where this has not been done it is so stated.—P. L. S.]

1. Mimus calandria (Lafr. et d'Orb.).

♀. Cosquin, Cordova, Arg. Rep., July 6, 1882. Iris olive-green.

A very wild bird, with an exceedingly strong pitching sort of flight and settling on the topmost branches of lofty trees. Not abundant at Cosquin.

2. Cotile fucata (Temm.).

♂. Cosquin, Cordova, Arg. Rep., August 16, 1882.
♀. " " " September 21, 1882.
Iris dark-brown.

I observed its first appearance at Cosquin on the 20th of July, and then only a single individual; but towards the end of August large numbers were to be seen, mostly skimming over the water of the river in places where there was a large clear surface and great depth beneath.

3. Pyranga azaræ, d'Orb. Voy. Ois. p. 264.

♂. Cosquin, Cordova, Arg. Rep., August 11, 1882.
♂ imm. Cosquin, Cordova, Arg. Rep., Oct. 2, 1882.
♀. Cosquin, Cordova, Arg. Rep., September 3, 1882.
Iris sepia.

These birds are rare at Cosquin; and when I first observed them there it was mid-winter, and they were frequenting the wooded ravines in the Sierras; towards spring they commenced to visit the valley early in the morning, but as the weather became warmer seemed to abandon the mountains altogether. I obtained my specimens as they came to feed on some bees that were kept not far from our encampment.

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[1] Cat. Rum. in Brit. Mus. p. 49 (1872).
[2] *Cf.* Selous, P. Z. S. 1881, p. 754.
[3] P. Z. S. 1882, p. 591.

The male is of a beautiful scarlet, the female yellow; and evidently the first plumage of the young male is also yellow, but subsequently gradually changes with the growth. Of this I was rendered certain by the capture of several specimens undergoing the process of transformation.

4. DONACOSPIZA ALBIFRONS (Vieill.).

♂. Cosquin, Cordova, Arg. Rep., July 5, 1882.
Iris sepia.

This is the only specimen I have seen of this bird, and one I obtained only by accident, as when I shot it I thought it to be a common *Zonotrichia*. It was met with in the well-wooded lands that fringe the mountain-slopes.

[Not seen by P. L. S.]

5. GUBERNATRIX CRISTATELLA (Vieill.).

♂. Cosquin, Cordova, Arg. Rep., Sept. 11, 1882.
Iris very dark.

I noticed these birds for the first time at Cosquin on the 22nd of July, after a snowstorm; three were together in the well-wooded lands up near the mountains. In the valley below, however, and in August they are met with more abundantly, but by no means commonly, and then always fly in pairs.

6. ZONOTRICHIA STRIGICEPS (Gould).

♂. Cosquin, Cordova, Arg. Rep., June 16, 1882.
♀. ,, ,, ,, Aug. 15, 1882.
Iris dark brown.

At first sight I mistook this bird for the Chingolo (*Z. pileata*); but the moment its chirp met my ear (a peculiar metallic ring) I knew it to be of a different species. It was met with, in a flock of about fifteen, in a well-wooded ravine at a tolerable elevation up the mountains, and only at one spot.

7. TÆNIOPTERA DOMINICANA (Vieill.).

♂. La Plata, Buenos Aires, Arg. Rep., Nov. 21, 1882.
Iris dark brown.
Rather rare here.
[Not seen by P. L. S.].

8. TÆNIOPTERA MURINA (Lafr. et d'Orb.).

♂. Cosquin, Cordova, Arg. Rep., June 21, 1882.
♀. ,, ,, ,, July 14, 1882.
Iris dark brown.

Not uncommon on the highlands covered with thorny brushwood, where I obtained my specimens.

[Mr. White's specimens are decidedly of this species, of which I have examples from the Rio Negro (*Hudson*, P. Z. S. 1872, p. 460) and the Sierra de Cordoba (*Döring*, P. Z. S. 1879, p. 460).]

9. CNIPOLEGUS HUDSONI (Scl.).

♂. Cosquin, Cordova, Arg. Rep., June 19, 1882.

Iris dark brown.

This bird was shot amongst the tolerably thick-wooded and lofty mountain-slopes, where I found it frequenting the topmost tree-twigs and darting thence at passing insects.

[Not examined by P. L. S.]

10. ANÆRETES PARULUS (Kittl.).

♂. Cosquin, Cordova, Arg. Rep., June 26, 1882.
♀. ,, ,, ,, June 23, 1882.

Iris dark.

In the thick brushwood near the river I found this little bird not uncommon.

11. CYANOTIS AZARÆ (Naum.).

♂. Cosquin, Cordova, Arg. Rep., Sept. 22, 1882.
♀. La Plata, Buenos Aires, Arg. Rep., Nov. 10, 1882.

Iris sky-blue.

These pretty little birds frequent in considerable numbers the rushes on some lagoons near La Plata. They skip from reed to reed about a foot above the surface of the water, all the while uttering a peculiar creaking little note, much resembling that of the cricket. At Cosquin, however, I obtained only one specimen; and that was on the river.

12. SYNALLAXIS STRIATICEPS (Lafr. et D'Orb.).

♂. Cosquin, Cordova, Arg. Rep., June 19, 1882.
♀. ,, ,, ,, July 25, 1882.

Iris brown.

This species is common amongst the woods on the mountain-side.

[Not examined by P. L. S.]

13. SYNALLAXIS SORDIDA (Kittl.).

♂. Cosquin, Cordova, Arg. Rep., Aug. 9, 1882.
♀. ,, ,, ,, June 15, 1882.

The abode of this bird seems to be the highlands, where it loves to frequent small shrubs and brushwood, into the deepest shade of which it penetrates. When startled, its flight is quick and dipping from one bush to another, uttering meanwhile a pretty trilling cry.

[Mr. White's specimens belong to this species, and not to *S. humicola* as he had supposed.—P. L. S.]

14. Coryphistera alaudina (Burm.).

♂. Cosquin, Cordova, Arg. Rep., June 20, 1882.
♀. ,, ,, ,, June 12, 1882.
Iris dark sepia.

These birds are not found in dense woods, but in the open, tenanted only by a few small trees or bushes.

Five or six are usually seen running about together with a quick, abrupt movement, meanwhile uttering a sharp cry.

15. Ceryle amazona (Lath.).

♂. Cosquin, Cordova, Arg. Rep. June 12, 1882.
♀. ,, ,, ,, June 22, 1882.
Iris brown.

A Kingfisher not uncommon at Cosquin, and usually met with along the acequias (irregular canals) which are made to flow over the cultivated lands. These streams, which are fed by dams from the river, are in places lined with brushwood and trees, and are tolerably deep, with a swiftly flowing current, abounding in small fish, so that the *Ceryle* seems to prefer them as a hunting ground to the bare rocky river-bed.

16. Picus mixtus, Bodd.

♂. Cosquin, Cordova, Arg. Rep., Aug. 17, 1882.
♀. ,, ,, ,, ,,
Iris crimson.

This little Woodpecker is by no means common in this neighbourhood, but is met with in the Algarroba woods.

17. Bolborhynchus aymara (d'Orb.).

♂. Cosquin, Cordova, Arg. Rep. Aug. 7, 1882.
Iris white.

The native name of this elegant little bird is "Catita de las Sierras." It is met with in flocks on the mountain-tops, about 3500 feet above the sea-level, and never descends to the valley. Its flight is very swift, accompanied the while by a sort of chirping, which by the inexperienced is almost always mistaken for a finch's note.

18. Strix decussata.

♂. Cosquin, Cordova, Arg. Rep., July 22, 1882.
Iris yellow.

This bird is called by the residents sometimes "Dormilon" (the Sleeper), at others "Ataja camino" (Bar-the-road), and does not appear to be common. My specimen was taken from a pair roosting together in the woods on the high slopes at the foot of the Sierras. It seems to seek the woods on the highlands to pass the day, and at night to descend to the valley.

As it sits so close, and the colour so exactly corresponds with that of the bare branches, I should never have discovered it had it not been startled at my approach and flown. Several mornings in succession I visited the same tree, and, although I crept up quite close under it, could never discover the pair until they took wing, which they always did very carefully on the opposite side to me; and as the foliage was so thick an opportunity for a flying shot never offered. Out of patience at last, one morning I tried a hap-hazard shot from a long distance with a heavy charge, and had the satisfaction of bagging one; but the other got away unwounded. Subsequently, whilst riding along one night on the eastern slope of the range of Sierras, I observed three or four, which were continually in the habit of alighting just in front of the horse's feet, and then, after an instant's pause and a very short flight, they returned to repeat the warning to trespassers.

[Not examined by P. L. S.; but *Scops brasilianus* (=*Strix decussata*, Licht.) is quite likely to be the bird intended.—P. L. S.]

19. GLAUCIDIUM NANUM (King).

♂. Cosquin, Cordova, Arg. Rep., June 23, 1882.
♀. " " " July 27, 1882.

Iris yellow.

It causes the naturalist much amusement to watch the habits of this pretty little Owl, that, perched perfectly motionless on a branch, utters such a sirenic cry as to attract little birds in great numbers. They are observed to cluster round it, all the while fluttering and in great excitement, charmed by some fascination. After waiting a while, the Owl suddenly pounces upon the nearest for its victim. The natives call it "El rey de los pajaritos" (The King of the little Birds).

20. NISUS STRIATUS.

♀. Cosquin, Cordova, Arg. Rep., Sept. 27, 1882.

Iris amber.

I saw no more than this specimen, which was shot on the Sierras at an elevation of 3500 feet above the sea-level.

[Not examined by P. L. S. =*Accipiter erythrocnemis*?]

21. HYPOTRIORCHIS FEMORALIS (Temm.).

♂. Cosquin, Cordova, Arg. Rep., July 4, 1882.

Iris dark brown.

During my lengthened stay at Cosquin I only observed two or three of these, one of which I obtained near the river.

[Not examined by P. L. S.]

22. POLYBORUS THARUS (Mol.).

♀. Cosquin, Cordova, Arg. Rep., July 27, 1882.

Iris brown. Carancho.

23. ARDEA COCOI (Linn.).

♀. Cosquin, Cordova, Arg. Rep., Sept. 23, 1882.

Iris amber.

Ardea cocoi is by no means common here, as during my stay of five months I only saw three or four.

Their usual position was, perched on a tree in early morning and not far from the river.

24. QUERQUEDULA FLAVIROSTRIS (Vieill.).

♂. Cosquin, Cordova, Arg. Rep., June 29, 1882.
♀. „ „ „ June 23, 1882.
Iris brown.

This Duck flies in flocks of about twenty in winter, nesting during August and September in holes on the clay banks of the river. The nest is formed of a large quantity of down, in which I found six eggs of a dull white colour. Dimensions: axis 54 millim., diam. 40 millim.

25. DAFILA SPINICAUDA (Vieill.).

♂. La Plata, Buenos Aires, Arg. Rep., Nov. 9, 1882.
Iris dark brown.

A common Duck, which frequents the lagoons about here in flocks.

26. MARECA CHILOENSIS (King).

♂. La Plata, Buenos Aires, Arg. Rep., Nov. 24, 1882.
♀. „ „ „ Nov. 4, 1882.
Iris dark brown.

Common in flocks about lagoons.

27. RALLUS RHYTIRHYNCHUS (Vieill.).

♂. Cosquin, Cordova, Arg. Rep., July 4, 1882.
Iris crimson.

An uncommon bird here, met with usually along the irrigation canals. Upper base of beak pale sky-blue, with a patch of crimson beneath, the rest of the beak deep green; legs crimson.

28. FULICA LEUCOPTERA (Vieill.).

♂. Cosquin, Cordova, Arg. Rep., June 16, 1882.
Iris crimson.

At Cosquin these birds are rare, and are only met with in the swamps that occur in the low ground in the vicinity of the river.

29. TRINGA FUSCICOLLIS, Vieill.

♂. La Plata, Buenos Aires, Arg. Rep., Nov. 3, 1882.
Iris brown.

Found abundantly in flocks on the edges of the lagoons, sometimes intermingled with flocks of *T. dorsalis*.

30. LIMOSA HUDSONICA (Lath.).

♂. La Plata, Buenos Aires, Arg. Rep., Nov. 10, 1882.
♀. „ „ „ Nov. 10, 1882.
Iris dark sepia.

Frequents the lagoons in flocks of about thirty.

31. **Podiceps caliparæus** (Lesson).

♂. Cosquin, Cordova, Arg. Rep., Sept. 6, 1882.

Iris crimson.

This was the only specimen seen, and obtained in the same locality as *P. rollandi.*

32. **Podiceps rollandi** (Q. et G.).

♂. Cosquin, Cordova, Arg. Rep., Sept. 11, 1882.
♀. „ „ „ Sept. 1, 1882.

Iris crimson.

These were obtained on the river; but I never observed any more.

33. **Nothura cinerascens**, Burm.

Cosquin, Cordova, Arg. Rep., Aug. 21, 1882.

Iris amber.

This species is met with on the thickly wooded slopes near the mountains, where the shrubs branch out quite low down, barely leaving room for the ingress and egress of the bird beneath. They are not common, and I only observed them singly. A slight rustling among the leaves alone indicates their presence; and if you are quick-sighted, you may get a glimpse of them as they start out two or three yards from cover. Once in the open, they stop abruptly an instant to plume their wings, and off they are over the trees with a flight neither long nor quick but very jerky; I found them, however, very difficult to shoot, on account of the density of arboreal growth.

[Besides the species mentioned in Mr. White's notes above given, Mr. White's collection, received by Mr. E. Gerrard, jun., contains several examples of a fine new Finch of the genus *Poospiza* named by Mr. White *P. erythrophrys*, but decidedly different, as I find on comparison with the type of the latter species in my collection. This I propose to dedicate to its discoverer as

Poospiza whitii, sp. nov. (Plate IX.)

Supra cinerea; capitis lateribus nigris, suprà superciliis longis, infrà strigis rictalibus albis marginatis; subtùs saturatè fulvo-castanea, ventre medio et imo albo, crisso fulvescente; subalaribus et campterio alari albis; caudâ plumbescenti-nigra; rectricibus lateralibus externis latè, duabus proximis angustiùs albo terminatis; rostro nigro, pedibus fuscescenti-carneis: long. tota 5·5, *alæ* 2·4, *caudæ* 2·6 *poll. Angl.* Fem. *mari similis, sed suprà fuscescenti-cinerea, et subtùs colore pectoris et laterum brunneo diversa.*

Hab. propè Cordova rep. Arg. (*E. W. White*).

Obs. Sp. *P. nigrorufæ* proxima, sed colore pectoris saturatè badio, neque rufo, facilè dignoscenda.

Mr. White's examples of this pretty species were obtained at Cosquin in June, July, and August last. The iris is noted as "dark brown."]

4. A few Rough Notes on the Aye-aye.

By the Rev. G. A. Shaw.

[Received January 23, 1883.]

This curious animal, the *Chiromys madagascariensis*, has evidently been named from the exclamations of the people who first saw it, and who, upon first sight of any thing so peculiar, would naturally utter the usual Malagasy exclamation of surprise, Hay! Hay! And at the present time among the people it is called the Haihày (pronounced Hayehaye).

Being a nocturnal animal, it is very difficult to get any reliable information concerning its habits in the wild state, and native reports are altogether contradictory with respect to these matters. Even with reference to its natural food no satisfactory explanation can be obtained from the people. Many assert positively that it lives on honey; but one I had in captivity for several months would not eat honey in any form, either strained or in the comb, or mixed with various things I thought he might have a fancy for. Others say it lives on fruits and leaves; others that birds and eggs are its natural food. I fancy from what I saw of my captive that both these conjectures are nearer the truth; for after a few days, during which it would eat nothing, and it was thought that the proper food had not been offered (but it was in reality pining or sulking), it took several fruits which I was able to procure for it. It liked bananas; but it made sorry efforts at eating them, its teeth being so placed that its mouth was frequently clogged with them. The small fruits of various native shrubs it also devoured, as also rice boiled in milk and sweetened with sugar; but meat, larvæ, moths, beetles, and eggs it would not touch. But I noticed that when I came near its cage with a light, it almost invariably started and went for a little distance in chase of the shadow cast by the pieces of banana attached to the wire-work in the front of its cage; and I think that if I could have procured some small birds it would have, if not devoured them, at any rate killed them for their blood, as some Lemurs are known to do[1]. It drank water occasionally, but in such a way as to make it highly probable that it does not drink from streams or pools in the ordinary way. It did not hold its food in its hands as the Lemurs which I have had in captivity have done, but merely used its hands to steady it on the bottom of the cage. But whenever it had eaten, although it did not always clean its hands, it invariably drew each of its long claws through its mouth, as though, in the natural state, these had taken a chief part in procuring the food.

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[1] In proof of this, I need only instance one fact seen by several persons. A vessel under Captain Lassen was sailing along the coast between here and Imahanore in the south, when, after a stormy morning, two land-birds, which had apparently been driven from shore and were exhausted, settled in the afternoon on one of the yards. A tame Lemur (*Lemur albifrons*) on board saw the birds alight, and crept up to them, seizing and killing them immediately, but after having sucked the blood let them fall upon the deck.

In some accounts, given by different writers, the Haihay is said to be easily tamed, and to be inoffensive. For instance, Sonnerat, who kept two in captivity, described it as "timid, inoffensive, and slow in its movements, in these respects resembling the Lories." In each of these qualities, except the "timidity," I have found, both from native accounts and from the specimen I have kept, that exactly the reverse is the case. It is very savage, and, when attacking, strikes with its hands with anything but a slow movement. As might be imagined in a nocturnal animal, its movements in the daytime are slow and uncertain; and it may be said to be inoffensive then.

When it bit at the wire netting in the front of its cage, I noticed that each of the pair of incisors in either jaw could separate sufficiently to admit the thick wire even down to the gum, the tips of the teeth then standing a considerable distance apart, leading to the supposition that, by some arrangement of the sockets of the teeth, they could be moved so far without breaking off. The Haihay brings forth one at a birth, in which the long claw is fully developed.

It is no wonder that in connection with so curious an animal a number of superstitious beliefs should be current among the Bétsimisáraka, in whose country the Haihay is principally found. In reference to its name, one account says that the first discoverers took it from one part of the island to another, the inhabitants of which had never seen it, and in their surprise they exclaimed Hay! Hay! Another tale is that many years ago some Bétsimisáraka had occasion to open an old tomb in which had been buried one of their ancestors. No sooner was the tomb opened than an animal into which the said ancestor had developed sprang out, and hence the exclamation of surprise that has attached itself as a name to this creature. Many of the Bétsimisáraka still believe that the Haihay is the embodiment of their forefathers, and hence will not touch it, much less do it an injury. It is said that when one is discovered dead in the forest, these people make a tomb for it and bury it with all the formality of a funeral. They think that if they attempt to catch it they will surely die in consequence; and when I have said to them, "But there is so-and-so who has brought several into Tamatave, and nothing has happened to him," the answer has been, "Yes! but he has its charm" (that is, the charm which counteracts the evil consequences of the act). The superstition extends even to the nest which the animal makes for itself. If a man receives from another, or picks up accidentally the portion on which the head of the Haihay has rested, it is sure to bring good fortune; while the receiving of that part on which its feet rested is followed by bad luck or death. This has even passed into a proverb among the Bétsimisáraka.

5. Description of a new Species of Lizard of the Genus *Enyalius*. By G. A. Boulenger, F.Z.S.

[Received January 30, 1883.]

(Plate X.)

Enyalius palpebralis, sp. n. (Plate X.)

Head broad, rounded, once and one third as long as broad, covered with irregular strongly keeled or conical scales, those on the canthus rostralis and the superciliary border a good deal larger and projecting. No distinct occipital. Loreal region concave, with small, irregular, keeled scales. Temporal region with small convex scales, intermixed with larger conical ones. Superciliary border much produced posteriorly, with a strong denticulation formed by seven large pointed scales, the hinder three largest, subequal; three large conical scales behind the orbit, followed by an oblique series of five conical scales. Labials about 15, equal. Scales of the back and sides small, keeled, irregular, intermixed with larger conical ones; the four or five series contiguous to the dorsal crest larger, rhomboidal, strongly keeled, the keels obliquely directed upwards. A nuchal crest formed of four large scales, the highest measuring the vertical diameter of the ear-opening, separated from the dorsal crest by an interspace equal to its length. A strong dorsal crest, gradually diminishing in height to the base of the tail, where it becomes double and indistinct; the highest scale of the dorsal crest measuring three fourths the vertical diameter of the ear-opening. Gular scales keeled, the median subconical. Scales on the limbs and on the pectoral and ventral regions strongly keeled. Tail compressed, with verticillate strongly keeled scales, five or six verticilli, gradually increasing in size. Upper surfaces yellowish brown; back with blackish markings, forming indistinct oblique bands down the sides; limbs marbled with brown; tail with brown annuli, interrupted inferiorly; lower surfaces immaculate.

	millim.
Total length (tail injured)	235
From tip of snout to ear-opening	31
" " fore limb	50
" " vent	120
Length of fore limb	59
" hind limb	78

A single (female) specimen, presented by Messrs. Veitch, is in the British Museum. It was collected by Mr. W. Davis at Cashiboya[1], in Eastern Peru.

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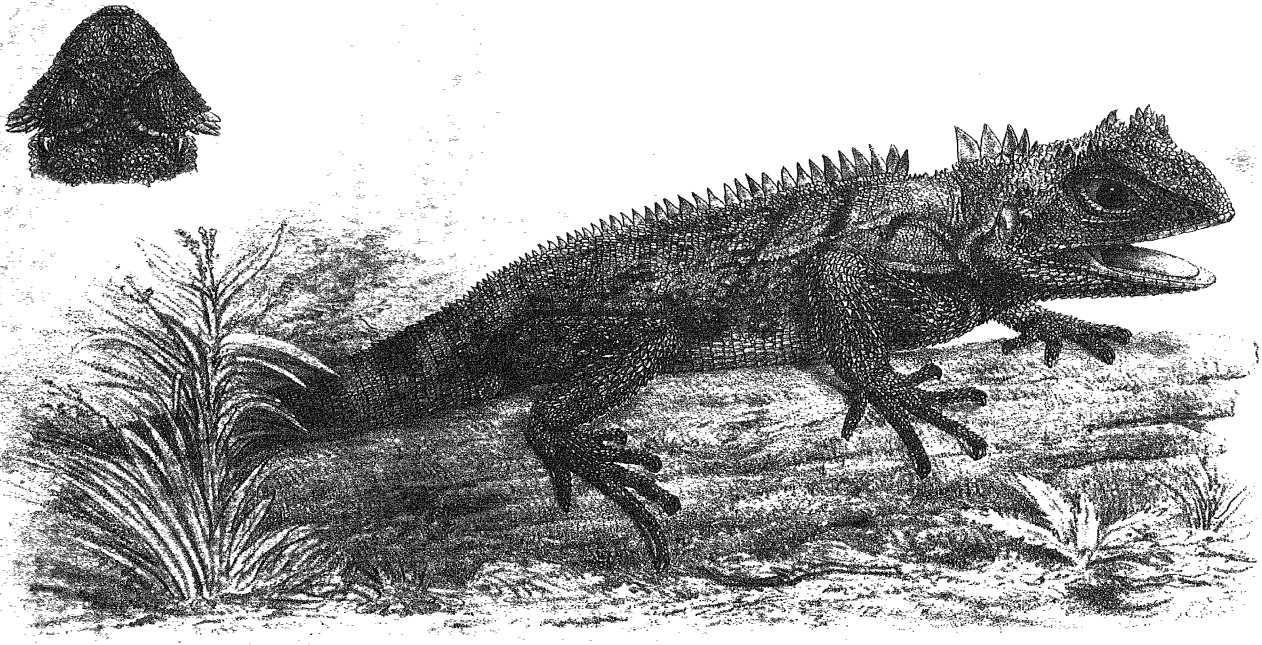
[1] See map in P. Z. S. 1875, p. 252, pl. xxv.

P Z S. 1883. Pl. X.



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ENYALIUS PALPEBRALIS.

February 20, 1883.

Prof. W. H. Flower, LL.D., F.R.S., President, in the Chair.

Professor F. Jeffrey Bell, F.Z.S., exhibited some microscopical preparations which he had lately obtained from the Zoological Station at Naples, and made the following remarks:—

The business of preparing satisfactory microscopical specimens of animals is attended with the expenditure of so much time, and requires so remarkable a combination of skill and opportunity, that the warmest thanks of hard-worked zoologists and teachers are due to the Staff of the Zoological Station at Naples for the services they have already rendered in this regard. It seems, however, that the Station has now ceased to prepare these specimens; and I do not now exhibit all that I asked Dr. Dohrn to be kind enough to send me, inasmuch as, in the words of Dr. Lang, "Die fehlenden Preparate sind leider nicht mehr auf Lager."

The specimens asked for were selected with an especial view to the demonstration to students of forms that are with trouble, or never, to be found in, or on the shores of, this country, or which exhibit points in the history of the development of animals which the Naples series easily provided. I direct, therefore, especial attention to the lateral view of a complete *Amphioxus*, carefully stained, in which most of the salient points in the anatomy of that remarkable vertebrate may be satisfactorily made out, and which should be of interest to those zoologists who have had to be satisfied with the many unsatisfactory representations of that animal that are given in most of the text-books.

Another example belonging to this series, is that curious parasite of the Comatulæ, *Myzostoma*, the exact zoological position of which can hardly be said to be yet satisfactorily ascertained, notwithstanding the notable investigations of Dr. Graff. Another curious and difficult form is *Sagitta*; but the specimens do not, unfortunately, give a very satisfactory view of the "fins."

Especial attention may be directed to the preparation of *Pyrosoma*, in which the four ascidiozooids and the remnants of the cyathozooid are to be made out; also to the *Scyphistoma*-stage of *Cotylorhiza borbonica*.

Of the second series, I direct attention to the preparations of embryonic stages of the common Lizard, in the earlier of which the medullary groove is still open behind; and to the segmenting ova and the gastrulæ of Echinoderms.

The other preparations now on the table exhibit various points of zoological or histological interest; and one and all present us with examples of manipulative skill of the highest order.

Mr. J. J. Weir exhibited and made remarks on a supposed hermaphrodite specimen of *Lycæna icarus*.

A communication was read from Mr. G. B. Sowerby, jun., containing the descriptions of nine new species of shells and of the opercula of two known species.

The following papers were read:—

1. On Birds collected in the Timor-Laut or Tenimber Group of Islands by Mr. Henry O. Forbes. By P. L. Sclater, M.A., Ph.D., F.R.S., Secretary to the Society.

[Received February 19, 1883.]

(Plates XI.–XIV.)

I have now the pleasure of placing before the meeting the first-fruits of the expedition to the Timor-Laut, or Tenimber, group of islands, carried out by Mr. Henry O. Forbes under the auspices of the British Association[1] last summer. They consist of a selection from Mr. Forbes's series of birds containing 70 skins, referable to 55 species, being the only portion of his collections that has yet reached England.

Mr. Forbes passed about three months (July, August, and September last) in the Tenimber group. The following extracts from his MS. report will show some of the difficulties which he experienced in commencing his collections:—

"After an interesting voyage, in which we called at Jessier at the eastern end of Ceram, at two points of New Guinea (where I had an opportunity of going ashore and seeing the people), and at both the Ké and Aroo islands, we landed at the village of Ritabel, in the islet of Larat, which lies off the north-east coast of Yamdena (as the northern of the two portions of Timor Laut is named), at a distance of about fifteen minutes' sail. Within an hour after landing us the 'Amboina' steamed away, leaving us to our fate for the next three months.

"Our first walk to the outskirts of Larat brought us face to face with the rather disagreeable fact that the place was in a state of siege. The whole village was enclosed with a double row of palisades; and the ground on every spot, where not absolutely devoid of vegetation, bristled with bayonet-shaped bamboos pointing in every direction. This was for protection against two neighbouring villages, Keleobar and Lamdesar, one to the right and the other to the left of us, who every now and then had been making midnight raids and sudden day-attacks on the Ritabel people, picking off with flint-lock and arrow every unsuspecting villager, and then making off. The dismembered bodies of the victims of these expeditions were to be seen swinging about in the breeze from the limbs of the trees near the village-gates, and dangling from pole-ends on the platforms erected on the sea-margin, where the dead are deposited. The terror of the villagers, who did not dare to venture any distance from the gates, and the bamboo-stakes distributed over the country, made collecting a very difficult matter. Few would volunteer to act as guides; and my hunters, shooting unaccompanied, were often laid up with wounds from the bamboo-spikes.

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[1] See Reports of the Timor-Laut Committee in Rep. Brit. Assoc. 1881, p. 197, and 1882, p. 275.

"Our first concern was to get a house, the huts being so small that to house our baggage or work in them was quite out of the question. A site was obtained only after the most vexatious delay by purchasing eight huts and removing them. At length, by the aid of a lavish remuneration we were able to erect a new dwelling, which was not finished till 17 days after our arrival."

The succeeding portion of Mr. Forbes's report is mainly occupied with anthropological matters; but the following paragraphs contain some general remarks upon the physical peculiarities of the Tenimber group:—

"The Tenimber Islands, as seen from the sea, are very low. There are no hills; nothing over 400 feet on the northern island nor on the surrounding islets, with the exception of Laibobar on the west coast of Yamdena, which rises to a height of about 1500 feet as seen from Larat across the mainland. The Tenimber group is surrounded (as I am told by the commander of H.B.M. ship 'Samarang') by a very deep sea. The islands are entirely of coral-formation. On the eastern shore of Yamdena there are coral cliffs of about 100 feet in height, from which immense stalagmites hang down. Along the beach are here and there blocks of tide-worn sandstone; but nowhere have I been able to find any sedimentary rocks save on the islet of Larat, near the village of Retabel, where, a few hundred feet inland from the shore, a short cliff, some 50 feet in height running in a N.W. and S.E. direction, exhibits a bed of stratified sandstone between coral conglomerates. Its texture is close and fine, and it is of a reddish-yellow colour. In the interior of Yamdena the coral lies a few inches below the surface, being covered only by a very thin layer of dark mould. There are absolutely no traces of sedimentary strata, with the exception of one small nodule of a fine calcareous sandstone. Along the shore low coral cliffs alternate with sandy baylets (the land is almost entirely of fine particles of coral and minute shells and broken fragments of Echini &c.), which are studded also with worn coral boulders. At the base of these cliffs, and in fact all along the shore, the floor, as exhibited at low tide, is composed of a black mud formed of disintegrated coral, vegetable refuse, small shells, sand, and fine mud, lying on a broken-up mass of coral concrete. Very few corals are alive within the space left by the tides or in the shallows near the margin. Here and there Madrepores and *Pirites* and *Tubipora* live on the undersides of the stones in the pools, or where they will be but a short time left exposed. Sponges, grey or dark brown or light yellow, like shoots of some young plants, expose their oscula on every rough eminence; while pale yellow or rich green patches of Alcyonias give colour to the grey shore.

"Among the Vertebrates only one Batrachian was found or seen.

Snakes were tolerably abundant, both on the mainland and on the small surrounding islands.

"Of Birds some 70 or 80 species were obtained. *Eos reticulata*, a small white Cockatoo, and a species of *Carpophaga* were among the commonest species. A species of *Geopelia* and two lovely species of *Ptilopus* are not uncommon. A species of *Megapodius* is found on the islands, but it is rather rare: its mounds were not even seen; it frequents the shore. The *Meropidæ* are represented by one species; the *Alcedinidæ* by one species; *Caprimulgidæ* by one species (not obtained); *Cypselidæ* by one species (*Collocalia*, not obtained); *Nectariniidæ* by one or two species; *Meliphagidæ* by one species; *Artamidæ* by one species; *Muscicapidæ* by several species; *Timeliidæ* by several; *Sylviidæ* by several; *Turdidæ* by two species; *Ploceidæ* by two or three species; *Corvidæ* by one species; *Charadriidæ* and *Scolopacidæ* by a few species; *Ardeidæ* by two species; *Anatidæ* by two species; *Lariidæ* by one species; *Falconidæ* by one or two species?; *Strigidæ* by two or three species; *Psittacidæ* by several species.

"Of Mammalia, Marsupials are represented by one species of *Cuscus*, which, however, is not very common. No Kangaroos are found in any of the islands; but a small species of mouse-like mammal, of which I was unable to catch a specimen, may be a *Perameles*.

"Of Rodentia there are perhaps two species of Rats. The *Sciuridæ* do not occur.

"Of Chiroptera there are several small species, besides a common *Pteropus* or 'Flying Fox.' The *Suidæ* are represented by one species of Pig, of which I was able to obtain only one young specimen. On the mainland are found large herds of Buffaloes, black when full-grown, but of a reddish colour in the calf. 'They came up out of the earth,' according to the native tradition. There are no Deer. One species of Sirenian frequents the shores, and is hunted for its large canines, from which the natives make ear-rings; it is *Halicore australis* in all probability.

"The Carnivora are represented by the *Viverra tangalunga*, which is found on the mainland and on the islets of Larat and Vertate (as far as known to me). On Vertate they are kept as pets.

Of these the *Viverra*, the Buffalo, the Rats, and perhaps the Pigs are almost certainly introduced. Perhaps also this is the case with the *Geopelia* among the birds.

"Timor Laut seems, from our present rough survey, to have great affinity with the Moluccan (Amboina) region, perhaps more than with the Timor group. The Insecta seem very closely to resemble those of Amboina; but the Lepidoptera and Coleoptera are excessively few in number."

The following is a list of the species of which examples are in the present collection, arranged according to the system adopted by Count T. Salvadori in his excellent work on the Ornithology of Papuasia and the Moluccas, just completed.

	Salvadori, *op. cit.*	Locality.	No. of examples.
I. ACCIPITRES.			
1. Pandion leucocephalus	i. p. 11	Kirimoen.	1
2. Haliastur girrenera...........	i. p. 15	Larat.	1
3. Tinnunculus moluccensis ...	i. p. 37	Loetoe.	1
4. Ninox forbesi, sp. nov.	....	Loetoe, Tenimber Is.	1
5. Strix sororcula, sp. nov.	....	Larat.	1
II. PSITTACI.			
6. Tanygnathus subaffinis, sp. nov.	....	Larat.	1
7. Geoffroius keiensis	....	Loetoe and Larat.	2
8. Eclectus riedeli, *Meyer*	iii. p. 517	Larat.	2
9. Eos reticulata	i. p. 245	Larat.	1
III. PICARIÆ.			
10. Sauropatis chloris	i. p. 470	Larat.	2
IV. PASSERES.			
11. Monarcha castus, sp. nov. ...	....	Loetoe.	1
12. —— mundus, sp. nov.........	....	(Label lost.)	1
13. —— nitidus....................	ii. p. 35	Moloe and Larat.	3
14. Rhipidura hamadryas, sp. nov.	....	Larat.	1
15. Myiagra fulviventris, sp. nov.	....	Larat.	1
16. Microeca hemixantha, sp. nov.	....	Loetoe and Larat.	3
17. Graucalus unimodus, sp. nov.	....	Larat.	1
18. —— melanops	ii. p. 130	Larat.	1
19. Lalage mœsta, sp. nov.	....	(Label lost.)	1
20. Artamus leucogaster	ii. p. 167	Larat.	2
21. Dicruropsis bracteatus.........	ii. p. 174	Larat.	1
22. Pachycephala arctitorquis, sp. nov.	....	Larat.	2
23. —— sp. inc. (♀)...............	....	Larat.	1
24. Nectarinia sp. inc. (♀)	....	Loetoe and Larat	2
25. Dicæum fulgidum, sp. nov....	....	Larat and Loetoe.	2
26. Myzomela annabellæ, sp. nov.	....	Loetoe.	1
27. Philemon plumigenis	ii. p. 353	Larat.	1
28. Geocichla sp. inc................	....	(Label lost.)	1
29. Munia molucca	ii. p. 434	Larat.	2
30. Erythrura tricolor (*Vieill.*)...	....	Loetoe.	1
31. Calornis metallica	ii. p. 447	Maroe.	1
32. —— crassa, sp. nov.	....	Larat.	2
33. Corvus validissimus	ii. p. 487	Kirimoen.	1
V. COLUMBÆ.			
34. Ptilopus wallacii...............	iii. p. 30	Larat.	1
35. —— xanthogaster	iii. p. 4	Larat.	2
36. Carpophaga concinna.........	iii. p. 81	Larat.	1
37. —— rosacea.....................	iii. p. 89	Loetoe and Maroe.	2
38. Myristicivora bicolor	iii. p. 107	Kirimoen.	1
39. Macropygia sp. inc.............	....	Larat.	1
40. Geopelia maugæi	iii. p. 157	Larat.	1
41. Chalcophaps chrysochlora ...	iii. p. 169	Larat.	1

Table (continued).

	Salvadori, *op. cit.*	Locality.	No. of examples.
VI. Gallinæ.			
42. Megapodius tenimberensis, sp. nov.	....	Loetoe.	2
VII. Grallatores.			
43. Orthorhampus magnirostris	iii. p. 290	Kirimoen.	1
44. Charadrius fulvus	iii. p. 294	Maroe.	1
45. Ægialitis geoffroii	iii. p. 298	Maroe.	1
46. Lobivanellus miles	iii. p. 306	Larat.	1
47. Totanus incanus	iii. p. 320	Moloe.	1
48. Numenius variegatus	iii. p. 332	Larat.	1
49. Ardea sumatrana	iii. p. 340	Larat.	1
50. Demiegretta sacra	iii. p. 345	Larat.	1
VIII. Natatores.			
51. Nettapus pulchellus	iii. p. 385	Larat.	1
52. Dendrocygna guttata	iii. p. 388	Larat.	1
53. Tadorna radjah	iii. p. 391	(No ticket.)	1
54. Onychoprion anæsthetus	iii. p. 449	Moloe.	1

I will now give descriptions of the new species, and notes upon several others imperfectly known.

4. Ninox forbesi, sp. nov. (Plate XI.)

Supra rufescenti-brunnea, fere unicolor, in alarum tectricibus et scapularibus fasciolis albis variegata; fronte et superciliis albis; alarum remigibus terreno-brunneis, nigro transfasciatis; subtus dorso concolor, mento albicante, ventre albo transfasciato; tarsis, omnino plumosis, cum subalaribus rufis unicoloribus; alarum et caudæ pagina inferiore pallide corylino-brunnea nigro regulariter transfasciata; rostri nigri apice flavicante; digitis fuscis setis obtectis: long. tota 11·0, *alæ* 7·4, *caudæ* 4·5, *tarsi* 1·3.

Hab. Loetoe, Timor Laut.

Obs. Sp. quoad colores *N. hantu* maxime affinis, sed facie alba fasciis ventris albis, et alis subtus nigro vittatis diversa.

The single specimen of this Owl is a male, obtained at Loetoe on August 9, 1881. It is noted:—"Irides golden; bill pale cinereous; feet pale yellow, covered with bristly hairs; soles of feet nearly orange."

I have dedicated this apparently distinct species to its discoverer, Mr. Henry Ogg Forbes, F.Z.S.

5. Strix sororcula, sp. nov.

Supra terreno-fusca flavicante variegata, et punctis rotundis albis regulariter aspersa; disco faciali amplo albo, margine nigricanti-brunneo circumdato; macula anteoculari nigricante; remi-

gibus fuscis, nigro transfasciatis, in pogoniis externis fulvo maculatis et albido vermiculatis; cauda nigricante, tæniis quinque fulvis transfasciata et albido vermiculata; subtus alba, præcipue in ventre maculis rotundis nigris fulvo cinctis aspersa, subalaribus ventre concoloribus; tarsis postice fere omnino plumulis obtectis, antice digitos versus setis paucis obsitis; rostro et pedibus carneis: long. tota 11·5, *alæ* 8·5, *caudæ* 3·5, *tarsi* 2·2.

Hab. Larat, inss. Tenimberensium.

Obs. Species *S. novæ-hollandiæ* affinis et ejusdem formæ, sed crassitie valde minore, tarsorum plumis brevioribus et dorsi punctis rotundioribus distinguenda.

Mr. Sharpe, who has kindly examined the single skin of this Owl sent, is of opinion that it belongs to a species allied to *Strix novæ-hollandiæ*, but easily recognizable by its inferior size.

The example was obtained on Larat on the 24th of September, 1882, and is labelled:—"Female: irides dark brown; bill, legs, and feet flesh-colour; legs covered with flesh-coloured bristles."

6. TANYGNATHUS SUBAFFINIS, sp. nov.

Flavicanti-viridis, in pileo et capitis lateribus prasinus, in dorso postico cæruleo lavatus; alis viridibus; scapularium apicibus, campterio alari extus et tectricum majorum marginibus cæruleis; secundariorum tectricibus flavo marginatis; cauda supra viridi, apice flavicante, subtus obscure aurulenta; subalaribus viridibus cæruleo mixtis, alarum pagina inferiore nigricante; rostro ruberrimo; pedibus nigris: long. tota 13·0, *alæ* 9·5, *caudæ* 6·0.

Hab. Larat, inss. Tenimberensium.

Obs. Species *T. affini* maxime affinis, sed dorso flavicante viridi vix cæruleo lavato, diversa.

The single specimen is a female, obtained in Larat on August 8. "Irides cream-yellow, with inner ring of pale gamboge."

8. ECLECTUS RIEDELI, Meyer, P. Z. S. 1881, p. 917.

Dr. A. B. Meyer has accurately described the female of this fine species, of which I exhibit a pair (the green bird marked "male" and the red bird "female"). I propose to give a description of them on a future occasion, as I have not yet been able to get access to a good series of the other *Eclecti.* But I may remark that the male is certainly not *E. westermanni*, Bp., as it has conspicuous red side-patches, nor the female *E. cornelia*, Bp., because, as pointed out by Dr. Meyer, the apical half of the tail and under tail-coverts are yellow.

11. MONARCHA CASTUS, sp. nov. (Plate XII. fig. 1.)

Supra niger; pileo et regione auriculari albis, fronte et tænia nucham cingente nigris circumdatis; dorso summo tæniæ nuchali proximo, uropygio et tectricibus alarum minoribus cum scapularium marginibus externis albis; subtus albus, gutture nigro, maculis tribus albis ornato; cauda alba, rectricibus tribus externis albo late terminatis; subalaribus et remigum pogoniis

internis albis; rostri plumbei tomiis albicantibus; pedibus plumbeis: long. tota 5·7, *alæ* 2·7, *caudæ* 2·8.

Hab. Loetoe, Timor Laut.

Obs. Affinis *M. leucoti,* sed gula nigra distinctus.

The single example is marked "Male: irides reddish brown; bill lavender; legs and feet ditto; September 1882."

Fig. 1.

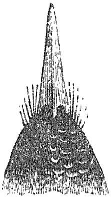

Fig. 2.

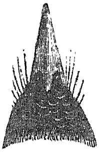

Fig. 1. Upper surface of bill of *Monarcha mundus.*
Fig. 2. Upper surface of bill of *Monarcha castus.*

12. Monarcha mundus, sp. nov. (Plate XII. fig. 2.)

Supra obscure cinereus, fronte lato, capitis lateribus et tectricibus alarum totis nigris; subtus albus, mento et plaga gulæ media nigris; cauda nigra, rectricum quatuor lateralium apicibus latis albis; subalaribus albis, remigum pagina inferiore cinerea; rostro compresso, colore plumbeo, gonyde ascendente; pedibus nigris: long. tota 6·0, *alæ* 3·2, *caudæ* 2·7.

Hab. Inss. Tenimberenses.

There is no label to the single specimen of this species, and the bill is slightly damaged at the point. It seems to be allied to *M. morotensis, M. bernsteini,* and *M. nigrimentum,* but has an unusually compressed bill, of which the gonys is slightly curved upwards.

14. Rhipidura hamadryas, sp. nov.

Supra castanea, in capite postico et cervice magis fuscescens, fronte dorso concolore; subtus pallide cervina, torque gutturali nigro; gula alba; alis caudaque nigricantibus, illis rufo anguste marginatis; hujus rectricibus externis cinerascente albo late terminatis; rostro et pedibus nigris: long. tota 5·7, *alæ* 2·3, *caudæ* 3·2.

Hab. Larat, inss. Tenimberensium.

Obs. Proxima *R. dryadi* (Gould, B. N. G. pt. ii. pl. 11), sed cervice postica rufescente nec fusca et alarum tectricibus rufo marginatis dignoscenda.

15. Myiagra fulviventris, sp. nov.

Supra plumbea, capite et dorso nitore cæruleo tinctis; alis et cauda fusco-nigricantibus; subtus saturate castaneo-rufa, abdomine et subalaribus fulvis; remigum marginibus interioribus albicantibus; rostro et pedibus nigris: long. tota 5·8, *alæ* 2·7, *caudæ* 2·7.

Hab. Larat, inss. Tenimberensium.

Obs. Proxima *M. rufigulæ* ex Timor, sed ventre et subalaribus fulvis distinguenda.

The single "male" in the collection is labelled, "Irides dark brown, bill lavender-blue, legs and feet black:" it was obtained in Larat on August 2nd, 1882.

16. MICRŒCA HEMIXANTHA, sp. nov.

Supra flavicanti-olivacea; alis caudaque fuscis dorsi colore marginatis, loris et linea superciliari obsoleta flavidis; macula auriculari fusca; subtus flava, remigum marginibus internis albidis; subalaribus flavis; rostri fusci mandibula inferiore pallida; pedibus nigris: long. tota 4·8, *alæ* 2·9, *caudæ* 2·1.

Hab. Larat et Loetoe.

Obs. Species *Pœcilodryadi papuanæ*, quoad colores, fere similis, sed, ut videtur, generi *Micrœcæ* apponenda.

17. GRAUCALUS UNIMODUS, sp. nov.

Totus cinereus, loris nigris; alis et cauda nigris, illarum tectricibus extus dorso concoloribus, remigibus cinereo anguste marginatis; subalaribus pallide isabellinis; remigum marginibus internis albicanti-cinereis; rostro et pedibus nigris: long. tota 13·0, *alæ* 7·2, *caudæ* 6·3, *tarsi* 1·1.

Hab. Larat, inss. Tenimberensium.

Obs. Species *Graucalo cæruleo-griseo* affinis, sed colore corporis cinerascentiore et remigibus intus non albis distinguenda.

Mr. Forbes's single specimen, a female (marked "Irides black; bill, legs, and feet black"), was obtained on Larat, August 4th, 1882. The male would probably be nearly similar.

19. LALAGE MŒSTA, sp. nov.

Supra sericeo-nigra; superciliis brevibus et uropygio albis; alis nigris, tectricibus minoribus et majoribus et secundariis albo late terminatis; corpore subtus, subalaribus et remigum pogoniis internis ad basin omnino albis; cauda nigra, rectricibus duabus externis albo terminatis; rostro et pedibus nigris: long. tota 6·2, *alæ* 3·7, *caudæ* 3·3.

Hab. Inss. Tenimberenses.

Obs. Affinis *L. atro-virenti* et *L. tricolori*, sed superciliis curtis albis dividenda.

The label of the single specimen has been torn off; and the exact island in which it was found is consequently not known.

22. PACHYCEPHALA ARCTITORQUIS, sp. nov. (Plate XIII.)

Supra cinerea, alis caudaque nigris cinereo limbatis, pileo nucha et capitis lateribus nigris; subtus alba, torque jugulari angusto nigro; subalaribus et remigum marginibus interioribus albis; rostro et pedibus nigris: long. tota 5·5, *alæ*, 3·0, *caudæ* 2·2. Fem. *Supra fusca, in pileo rufescens; alis nigris extus rufo limbatis; subtus alba, obsolete nigro striata.*

Hab. Larat, inss. Tenimberensium.

Obs Similis *P. leucogastro*, sed torque angusto distinguenda.

The pair of this species were obtained in Larat, in the first week of August 1882. The iris is marked "reddish brown" in the male, and "dark brown" in the female; the feet "blue-black" in the male, and "lavender-pink" in the female.

25. DICÆUM FULGIDUM, sp. nov.

Supra nitide purpurascenti-nigrum; subtus album coccineo perfusum; hypochondriis olivaceo mixtis; subalaribus et remigum pogoniis internis albis; rostro et pedibus nigris: long. tota 3·6, *alæ* 2·0, *caudæ* 1·1.

Hab. Larat et Loetoe.

Obs. Similis *D. keiensi* et *D. ignicolli*, sed ventre toto coccineo perfuso distinctum.

There are two "male" examples of this *Dicæum* in the present collection—one from Larat (1.8.82) and one from Loetoe (19.9.82). Both are labelled, "Irides dark brown; legs and feet black."

26. MYZOMELA ANNABELLÆ, sp. nov.

Nigra; capite cum gutture toto undique et dorso postico coccineis; ventre medio et remigum marginibus externis strictissimis olivaceis; subalaribus et remigum pogoniis internis albis; rostro et pedibus nigris: long. tota 3·5, *alæ* 2·0, *caudæ* 1·3.

Hab. Loetoe, Timor Laut.

Obs. Sp. ad *M. erythrocephalam* et species huic affines adjungenda, corpore coloris nigro et crassitie minore insignis.

The single specimen was obtained September 29th at Loetoe. It is marked "Male: irides dark brown; bill black; legs and feet dirty green." I have named it by request of the discoverer after his wife, who accompanied him in his perilous travels.

28. GEOCICHLA sp. inc.

Mr. Seebohm, to whom I have referred the single specimen of this species, kindly writes me:—"The *Geocichla* from Timor Laut is evidently, a young bird in first plumage, which has not quite finished its first moult into the plumage of birds of the year. So far as it is possible to judge, the plumage of the upper parts in the adult bird would not differ from that of *G. peroni* of Timor (Cat. B. B. M. v. p. 169). The underparts are more difficult to understand. I think the buff feathers with the black terminal crescents are new feathers. If this be so, the underparts will be probably like those of *G. imbricata* from Ceylon. Unfortunately we do not know the young in first plumage of *G. peroni*; but I do not think that your bird can be it. I think it will prove to belong to a new species."

I think, however, it will be better to defer the description of this bird until other specimens have been obtained.

32. CALORNIS CRASSA, sp. nov. (Plate XIV.)

Obscure cineraceo-viridis nitore chalybeo; subtus, præcipue in ventre, paulo magis cineracea; alis caudaque nigris extus dorsi *colore lavatis; remigum marginibus interioribus fuliginosis; rostro et pedibus nigris; cauda fere æquali aut paulum rotundata: long. tota 7·3, alæ 4·1, caudæ 2·8.* Fem. *Supra cineracea, striis scaparum nigris variegata; alis caudaque fusco-nigris; subtus alba nigro flammulata; crassitie fere eadem.*

Hab. Larat, inss. Tenimberensium.

Obs. Species cauda fere æquali, corpore crasso, rostro robusto et colore maris uniformi notabilis.

Both male (August 1st) and female (August 8th) are marked "Irides dark brown; bill, legs, and feet black."

42. MEGAPODIUS TENIMBERENSIS, sp. nov.

Supra brunnescenti-olivaceus, in cervice magis cinereus, in dorso postico magis brunnescens; pileo subcristato interscapulio concolore; subtus cineraceus olivaceo tinctus; capitis lateralis et gulæ pelle rubra plumis paucis obsita; subalaribus ventre concoloribus; rostro flavo; tarsis antice nigris postice rubris, digitis nigris: long. tota 11·5, alæ 9·6, caudæ 3·5, tarsi 2·8.

Hab. Kirimoen et Loetoe, inss. Tenimberensium.

Obs. Species pedum colore ad *M. geelvinkianum* corporis pictura magis ad *M. tumulum* appropinquans.

There are two specimens of this apparently new Megapode in the collection. One from Loetoe, Timor Laut, obtained September 22nd, is marked "Irides dark brown; bill pale yellow; legs in front black, but front of knees red, back of legs red; feet black." The other, from Kirimoen, is labelled "Iris brown; bill pale yellow; legs and feet red." But the colours of these last-named parts, so far as can be told from the dry skins, do not materially differ from those of the first specimen; and the two birds agree in plumage, except that the specimen from the islet of Kirimoen is rather more reddish on the face.

To conclude this communication I will say a few words concerning the general character of the avifauna of the Tenimber Islands so far as it is indicated by this collection. It is quite evident that the prevailing facies of this ornis is, as might have been expected, predominantly Papuan. Of the 54 species included in the above-given list, 33 are mentioned in Salvadori's work. Of the 15 new species all are of Papuan genera, and nearly allied to known Papuan species except the *Strix*, which appears to be a diminutive form of an Australian type, and the *Myiagra*, which is nearest to a Timor form. Of the 4 indeterminable species, three are Papuan forms, but the fourth (the *Geocichla*) is probably most nearly allied to a Timor bird. There is also in the collection one other Timor bird, *Erythrura tricolor*, which is not found in New Guinea or the Moluccas. I think, therefore, we may fairly say that the Tenimborese Avifauna is preeminently Papuan, varied only by a slight element from Timor (represented by *Erythrura tricolor, Myiagra fulviventris*, and the *Geocichla*), and by an Australian tinge shown by the *Strix*, and perhaps by *Monarcha nitidus* being present (as in the Aroo Islands) instead of *M. chalybeocephalus*.

That the Tenimber group would possess a certain number of peculiar endemic forms was also to be expected, from their isolated situation and the deep channel around them. Altogether these are 17 in number, namely the 15 species above described as new, and two Parrots (*Eos reticulata* and *Eclectus riedeli*) previously known. To these must be added probably a "White Cockatoo" spoken of by Mr. Forbes in his report, but of which no specimen is in the collection. This species is in all probability *Cacatua citrinocristata*, well known as a cage-bird, but of which the true "habitat" has never been positively ascertained, though it has always been suspected to be from the Tenimber Islands[1].

2. Studies in the Holothuroidea.—II. Descriptions of new Species. By F. Jeffrey Bell, M.A., Sec. R.M.S., F.Z.S., Professor of Comparative Anatomy in King's College.

[Received February 19, 1883.]

(Plate XV.)

A survey of the British-Museum collection of Holothuroidea reveals the presence of a number of forms which have never yet been subjected to systematic examination or description.

It may be convenient, now that they are about to find a new home, to provide them, or some of them, with definite names, wherewith to enter the "Spirit-room" at South Kensington.

CAUDINA MERIDIONALIS. (Plate XV. fig. 1.)

It is interesting to find a third species of this curious genus so soon after the description by Marenzeller of *C. ransonnetti* from the Yellow Sea.

"Body" tending to be square; "tail" quite as long as or longer than the body. When the tentacles are retracted, the anterior end is blunter and squarer than in *C. arenata*. No sign of any genital papilla; but this may be due to the extreme corrugation of both the examples. The aboral prolongations of the radial pieces of the buccal skeleton are longer and narrower than in either of the already described species, and the intermediate cleft is consequently of considerable extent. The sides of the radial pieces are not deeply excavated as in *C. ransonnetti*. Connected with the ring are a number of long free ampullæ; it was not possible to make out the characters either of the Polian vesicles or of the tentacles.

The calcareous bodies in the integument are very different to those of *C. arenata*, the surface view presenting us with a kind of

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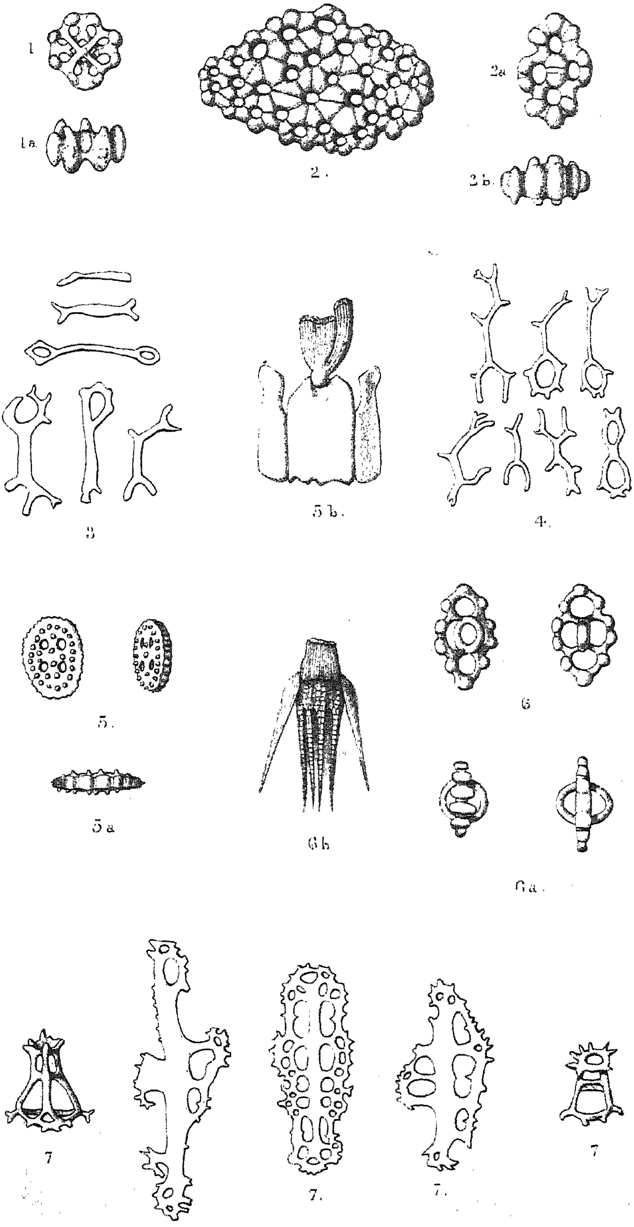
[1] Cf. Wallace, P. Z. S. 1864, p. 280.



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SPICULES OF NEW HOLOTHUROIDEA.

mulberry form, the bars not projecting out so far or so freely as they do in *C. ransonnetti*. The composing bars are exceedingly stout, and the spaces between them proportionately small. (Plate XV. fig. 1.)

Colour brownish yellow or yellowish white.

Length (skin much corrugated) :—"body" 35; 50; "tail" 37; 73. Breadth of "body" 15; 16 millim.

A specimen found on an anchor-cable at Wellington, New Zealand (presented by W. Wykeham Perry, Esq.), gives an exact locality for the species; another specimen was collected by the Antarctic Expedition.

OCNUS VICARIUS. (Plate XV. fig. 2.)

In associating this species with the genus *Ocnus* rather than *Cucumaria*, I have to point out that it appears to represent in the Southern Seas *Cucumaria culcigera*, and to raise the question as to whether, at present, we have drawn the best and most natural line of demarcation between these two genera.

Ten tentacles, of which two are shorter than the rest, not frequently divided; body elongated in form; integument thin but very firm, on account of the rich deposit of calcareous bodies in its substance. The ambulacral suckers in pairs, but the pairs so irregular, though confined to their own areas, that there is almost a zigzag arrangement; the costate arrangement at the anal extremity is only faintly indicated. The spicules, which are very richly developed in the skin, have, apparently typically, four central holes with at least one complete circlet of smaller holes; some attain to a great size. The supporting rods in the suckers are richly developed.

The retractors are slender and rather short; the component pieces of the buccal armature delicate. The other details of internal structure could not be made out in the specimen dissected.

Measurements in millim.:—

Length.. 41; 28; 18·5. Breadth.. 8; 6·5; 4·5.

Colour (after preservation in spirit for many years) white.

Locality: the Antarctic area is hinted at by the specimens having been collected by Sir E. Belcher.

THYONE MERIDIONALIS. (Plate XV. fig. 3.)

Body truncated in front when the tentacles (in the size of which there is no marked difference) are retracted, tapering very considerably at the hinder end; suckers absent from the greater part of the bivial surface, well enough developed above, and diminishing in number on either side as they approach the bivium. Integument thin, except in the more anterior region. No calcareous teeth to the anus.

Retractors of the proboscis inserted nearly as far back as the middle of the body, very wide at their insertion; each band divisible into three or four smaller bands. Polian vesicle single, nearly equal to a third of the length of the body, much contracted at its free end.

The interradial pieces of the calcareous ring are not as much as half the width of the radial, nor are they quite so high. Both sets are elongated, their sides parallel, and without any prominent notch at their proximal end.

The only spicules appear to be the very sparsely distributed rods found in the walls of the suckers. I may point out that in another species of this genus lately examined by me I have noted a complete absence of calcareous spicules.

Length[1] 77; 52 millim. Greatest breadth 38; 25.

In the larger specimen the Polian vesicle is 25 millim. long, and the distance between the points of origin and insertion of the retractors is 45 millim.

Colour dark or lighter brown, anterior end white in parts.

Possession Bay, Straits of Magellan. Coll. Cunningham.

THYONE CUNNINGHAMI. (Plate XV. fig. 4.)

Body stout, narrowing suddenly at the hinder end; tentacles subequal, yellowish cream-coloured; suckers much better developed on the trivial than on the bivial surface. Skin thicker posteriorly than anteriorly; quite thin in front. Anus without teeth, but fringed by papillæ.

Retractors stout, distinctly double, inserted very far back, behind the middle of the length of the body. Polian vesicle delicate, elongated in form and not very short. The distal end of the buccal skeleton is very stout; the interradial is a little narrower than the radial piece, or, as the sides of both are not exactly parallel, they are rather narrower at their free end than at their base.

Spicules rather delicate rods, often pitchfork-shaped, or swollen and perforated at their ends, sometimes more irregular in form.

The single specimen is 50 millim. long, 17 wide; Polian vesicle 10 long; insertion of retractors 28 millim. from their origin.

Colour light grey.

Off Dungeness, Patagonia. Coll. Cunningham.

PHYLLOPHORUS DOBSONI. (Plate XV. figs. 5, 5 *a*, 5 *b*.)

Of the four species[2] of this genus already known, it would be with one only, *P. holothuroides* of Ludwig, that, even at first sight, we should feel inclined to associate this new form. The spicules, the buccal armature, and the arrangement of suckers on the trivium are, however, very different.

Rounded in form, about twice as long as broad, with a soft integument, with the suckers irregularly distributed, covering the bivium and both ends, but scarce or absent in the central portion of the trivium. The retracted gills appear to be 18 in number, of which 6 are internal to the rest; retractors fairly stout, very short. Polian vesicles two, rather short, irregular in shape. Genital tubes numerous, of some length, extending back as far as the middle of the body; the last division may have four terminal branches.

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[1] Owing to the shape of the bodies their length can only be approximately given.

[2] The name only of *P. tenuis* can be said to be known.

The calcareous ring is remarkably well developed, the radial pieces being very stout and broad, a little hollowed externally, with the backwardly directed processes short and feeble; the proximal end of the interradial piece is constricted (fig. 5 *b*).

The only calcareous bodies that were detected either in the skin, which is not remarkably thick, or in the walls of the suckers were stoutish discoidal bodies the perforations in which may be rare and small. They are present in large numbers.

Length 80 millim., breadth about 50, length of calcareous ring 14, Polian vesicle 10.

Colour—ground-colour white, the trivial surface with blotches of dark brown; lighter brown spots, lines, or patches may be seen on the bivium.

Hab. Bay of Honduras. Collected by G. E. Dobson, M.B., and presented by him to the British Museum.

I have the pleasure of associating with this species the name of its discoverer, a name well known to all zoologists.

STEREODERMA MURRAYI. (Plate XV. figs. 6, 6 *a*, 6 *b*.)

I have been for some time acquainted with a second species of this remarkably firm-bodied genus, an account of which will appear in the forthcoming report on the zoological collections made by H.M.S. 'Alert.' It has fortunately happened that that new species is particularly well represented; and the supply of specimens has enabled me to note that there are considerable variations in the arrangement of the suckers in the "double row," and that the regularity of this may become considerably obscured.

Fortified by these examples, I have less hesitation than I should otherwise have had in associating with this genus a single, rather small specimen from the seas of Kurrachee, which the British Museum owes to Mr. Murray. I venture to associate the name of this energetic curator with this interesting new species.

Tentacles small, dark; retractors exceedingly delicate, though with a broad base of origin; Polian vesicle very long and narrow; œsophagus covered with a calcareous plating, much as in *Thyone sacellus* (see Selenka, Zeitschr. f. wiss. Zool. xvii. pl. xx. fig. 115). (Plate XV. fig. 6 *b*.)

Integument very thick, and filled with strong-walled firm corpuscles, not so thick, however, as in *S. unisemita*, or so large as in *S. validum*.

Skin white in colour, the double row of the suckers only well developed in the anterior third of the body, but better developed behind than in the middle.

About 30 millim. long and 11 wide; of the same, or nearly the same, width along its whole extent.

Hab. Kurrachee. In exchange with the Kurrachee Museum.

STICHOPUS ASSIMILIS. (Plate XV. fig. 7.)

This species would appear to have a considerable resemblance to the form lately described by Prof. Greef[1] from Rolas (*S. maculatus*); but it is at once to be distinguished from it by the characters of its spicules.

Body elongated considerably, the suckers richly developed on the trivial surface; a shallow groove extends down the middle of the trivium from the mouth along the anterior two thirds of its length. The suckers are so numerous that the existence of three sets of rows is only faintly indicated. Papillæ and suckers of bivium richly and well developed.

The pieces of the calcareous ring are short, but very broad; the rest of the viscera have been largely ejected; but there is evidence in favour of the genital tubes having been few, simple, and, in proportion to the body, short.

The integument is pretty thick, and is very richly supplied with spicules; in addition to the turriform bodies there are flattened reticulated bars of very characteristic appearance; but I have detected none of the ordinary C-shaped bodies.

Length 116 millim.; breadth 28 millim.

Colour deep chocolate-brown (in spirit), but a patchwork of colour not unlike that of *S. maculatus* was, probably, to a certain extent developed in this species.

Hab. Angola. Purchased of Mr. Monteiro.

EXPLANATION OF PLATE XV.

Fig. 1. Spicule of *Caudina meridionalis*, p. 58. 1 *a*. Seen from the side.
2. ,, *Ocnus vicarius*, p. 59. 2 *b*. Seen from the side.
3. ,, *Thyone meridionalis*, p. 59.
4. ,, *Thyone cunninghami*, p. 60.
5. ,, *Phyllophorus dobsoni*, p. 60. 5 *a*. Seen from the side.
6. ,, *Stereoderma murrayi*, p. 61.
7. ,, *Stichopus assimilis*, p. 62.

All these are magnified 220 times.

5 *b*. Calcareous ring of *P. dobsoni*, multiplied twice nat. size.
6 *b*. Calcareous ring of *S. murrayi*, multiplied three times.

3. On the Suctorial Apparatus of the Tenuirostres.
By Dr. HANS GADOW.

[Received February 20, 1883.]

(Plate XVI.)

The following remarks are devoted to an explanation of the manner in which the sucking of the "Tenuirostres" is performed. This applies chiefly to the *Nectariniinæ* and *Meliphaginæ*. *Zosterops* and *Certhia*, although not suctorial birds, are treated of likewise, because they are closely allied to the Tubilingues. The Trochilidæ are mentioned

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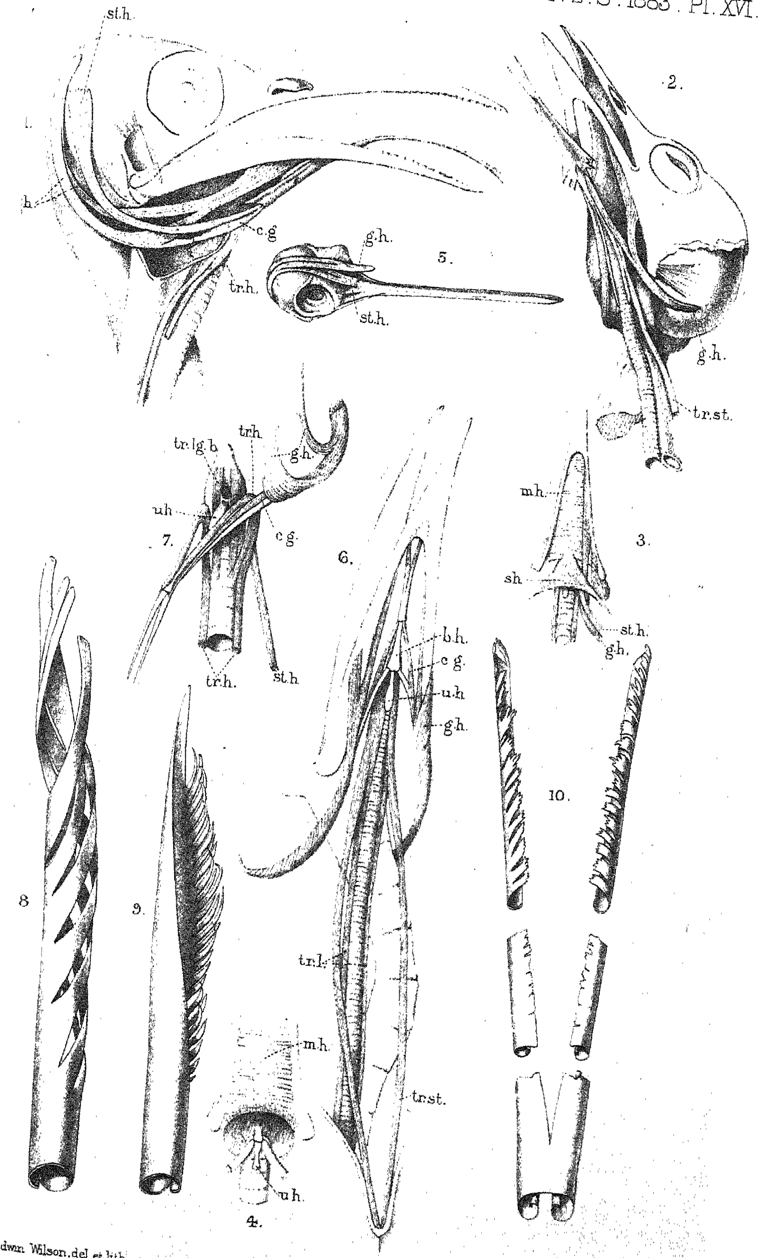
[1] Zool. Anzeiger, v. p. 158.



Edwin Wilson, del et lith.

Mintern Bros. imp.

for comparison; they afford an illustration of the fact that similar functional requirements frequently lead to the development of similar structures in animals which are otherwise very distinct.

The *skeletal framework* of the hyoid apparatus does not present any important peculiarities. It consists:—(1) of the two posterior or long cornua, which are extremely long in the Trochilidæ, but very short in *Zosterops* and *Certhia*, whilst in the Meliphagidæ and in the *Nectariniinæ* their apices do not reach further than the frontal bones; (2) the basihyal, unpaired and formed by a slender bony rod, bifurcating at each end; (3) the os entoglossum, which is paired, the two parts articulating with the anterior ends of the basihyal, and ending as fine, tapering, more or less cartilaginous rods; (4) a urohyal, attached to the ventral aspect of the trachea by a short ligament, its anterior portion articulating with the basihyal. This little bone does not serve for the origin or the insertion of any muscles in the birds in question. The anterior or short cornua have become obsolete.

In the Trochilidæ the basihyal is extremely thin and short, whilst the urohyal seems to be generally absent, and the long cornua and the entoglossal bones are very long.

The horny sheath surrounding the os or ossa entoglossa, and projecting more or less in front of them, exhibits very great differences in the various groups of Tenuirostral birds.

The simplest form is represented by *Zosterops* (Plate XVI. fig. 2). The tongue ends in two short filaments, whilst the greater portion of the tongue proper is not divided; dorsal and ventral aspect smooth, hinder portion of horny sheath projecting backwards with a few (about 3–4) horny spines.

In *Certhia* the tongue corresponds with the length of the bill; its lateral margins are transformed into sharp cutting-edges; the tip is frequently split into three short bristles of irregular shape; the posterior margin ends much as in *Zosterops*. Along the middle line on the upper surface of the tongue we notice a slight depression.

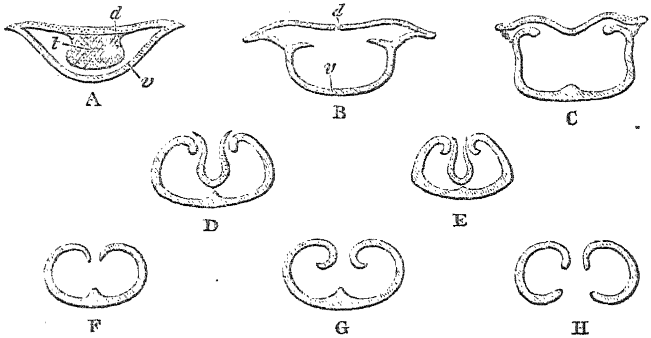
Whilst in the two genera described above the horny sheath of the tongue shows still a very simple formation, it has in the following families been developed into a very complicated and elaborate organ.

In order to ascertain the formation of the tubular tongues of the *Nectariniinæ* and *Meliphaginæ*, I have made a series of transverse sections through that organ in *Nectarinia splendida*, *Cinnyris auriceps*, *Anthothreptes malaccensis*, *A. subcollaris*, *Prosthemadera*, *Ptilotis carunculata*, and, for comparison, of a species of the Trochilidæ.

The accompanying drawing (fig. 1, p. 64) represents a series of eight stages of the tongue of *Cinnyris*, whilst figures 8 and 10 of Plate XVI. show the entire tubes as seen from the ventral side.

Near the root of the tongue, *i. e.* near the basal part of the os entoglossum, the dorsal and ventral halves of the horny sheath with which the tongue is covered project to the right and left sides, so as to form sharp, more or less cutting-edges. A little more in front, hese lateral parts are slightly curved upwards, the ventral sheath thus becoming convex whilst the dorsal layer becomes slightly concave. A little further forward, we observe that the ventral sheath near its upper or lateral end sends off a small outgrowth, which, first directed upwards and inwards towards the middle line, soon curls its free and slightly thickened end up, with its concave side looking downwards and inwards (stages B and C, fig. 1, p. 64). At the same time the dorsal half of the horny sheath becomes thinner and gradually loses its connexion with the lateral edge of the ventral sheath, whilst its median portion forms a depression. This depression increases in depth, and this leads to the formation represented by stage D. The dorsal sheath at this stage has entirely lost continuity with the ventral sheath, principally because its lateral portions and the original lateral portion of the ventral layer have become wholly reduced. The rest of the dorsal sheath at this level forms now a deep canal or semi-tube with its open part looking upwards, forming a deep longitudinal furrow on the dorsal side of the tongue. A little more in front, near the tip of the os entoglossum, the dorsal sheath, owing to the tapering pointed shape of this part of the tongue, is reduced to a small bit of only half horny epithelium, situated in the middle line on the dorsal surface of the ventral sheath; and the whole sheath of the tongue is now represented by the ventral sheath alone. With the disappearance of the rest of the dorsal sheath, the free edges of the ventral one curl more and more inwards, so as to meet in the middle line and to form a complete tube, consisting of a right and of a left half (stage F). In some species, *e. g.* in *Nectarinia splendida*, the free edges continue to curl inwards until this leads to the formation of a median and two lateral tubes, which three tubes, of course, are continuous with each other, since they are simple modifications of the primary tube.

Fig. 1.



Sections of the tongue of *Cinnyris*.

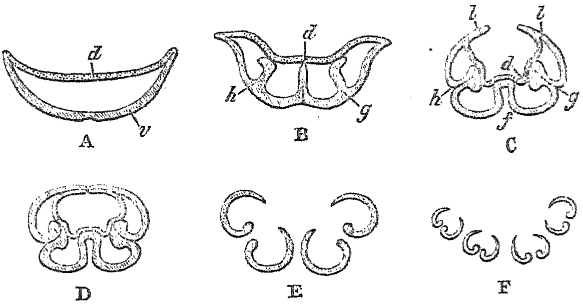
After the disappearance of the rest of the dorsal sheath, we notice a slight swelling of the median portion of the tube; and a few millimetres in front of this little ridge the tube separates or splits up into a right and into a left half. The median edges are very thin, and as they likewise slightly curl up, two secondary tubes, more or less completely closed, are formed. Further in front, these median edges become laciniated in various ways. Towards the tip of the tubes the greater portion of the thin lamella constituting them splits up into bristles; but the outer edge seems to remain intact. The mode of splitting up, or the shape of these laciniæ, vibrissæ, or bristles of the median parts of the tubes seems to be characteristic of the different species, and even of the genera. The drawings of these delicate parts (Plate XVI. figs. 8–10) will explain their shape and formation much better than any amount of description.

We meet with a similar but much more complicated formation in the tongue of the *Meliphaginæ*. Their os entoglossum ends in two cartilaginous filaments; and the whole tongue shows a truly dichotomous arrangement, which towards the tip leads to the formation of the well-known "brush."

The second drawing exhibited (fig. 2, p. 65) shows a series of sections through the tongue of *Ptilotis carunculata*.

Stage A corresponds with that in *Cinnyris*; but in the next stage we see that the median unpaired and the two lateral inwardly directed outgrowths of the ventral sheath are much stronger than in the corresponding regions of the tongue of *Cinnyris*. In stage C the approaching separation into a right and left half is indicated by a deep fissure *f*, and we observe similar fissures in the two lateral outgrowths (*g* and *h*). The lateral horns (*l*) of the ventral sheath do not become reduced, but are preserved; and the dorsal sheath (*d*) forms a thin and only half-cornified lining to the cavity or open groove on the upper side of the tongue. In front of this section, corresponding to the level D in fig. 2, the separation into a right and left half is complete, and the remnants of the dorsal sheath are seen in a similar position to that which they occupy in fig. 1 D, in *Cinnyris*.

Fig. 2.



Sections of the tongue of *Ptilotis carunculata*.

In the next stage E, the right and left halves separate into secondary tubes through the fissures at *g* and *h* becoming completed. The curling inwards of the free edges leads to the formation of four more or less complete secondary tubes, two external and two median. Each of these four tubes divides again on its median line; and thus are formed eight tertiary, or perhaps rather four double tubes. These latter tubes break up again and again, but without forming new tubes, forming only the so-called brush of the tongue. This consists of about 80 or more horny bristles in *Prosthemadera*.

A similar arrangement is met with in the few other *Meliphaginæ* which I have been enabled to examine, viz. *Mohoa*, *Anthornis*, and *Meliphaga*.

The most important differences between the *Nectariniinæ* and *Meliphaginæ* in regard to the horny part of the tongue are therefore, first, that the tongue in the former does not form more than two tubes, whilst in the latter it is broken up dichotomously into 2, 4, 8, etc.; secondly, that in the *Meliphaginæ* it is always the external border of every tube that becomes laciniated, but in the *Nectariniinæ* it is the inner or median border, whilst the external margin remains entire.

In the *Trochilidæ* we meet with a third sort of tubular tongue.

The tongue of these birds is double right down to the unpaired part of the os entoglossum, whilst each of the two distal prolongations of the entoglossal bone or cartilage is surrounded by a horny sheath, which is curled upwards and inwards, in a similar fashion to what we have seen in the *Nectariniinæ*. In many species the outer and inner edges of these tubes, however, are entire, and not laciniated. Thus the Trochilidæ have developed the highest form of tubular tongue.

The Muscles of the Tongue.

NECTARINIA SPLENDIDA.

M. mylo-hyoideus. This muscle fills the distal two thirds of the mandibular space; it arises from the inner aspect of the mandibles, and throughout its length fuses with its fellow of the other side. Its fibres run in a transverse direction. Near the anterior margin of the serpi-hyoid muscles, the mylo-hyoid is doubled up and is inserted into the soft and transversely wrinkled outer sheath of the basal part of the tongue proper (Plate XVI. fig. 1).

M. serpi-hyoideus is the most superficial of the muscles of the hyoid apparatus. It occupies the basal or proximal half of the space between the mandibles; it arises as a narrow semitendinous slip from the posterior and upper angle of the processus serpiformis mandibulæ immediately behind the masseter muscles. Its fibres are directed obliquely forwards and downwards, fusing with those from the other side in the middle line, without, however, forming a distinct linea tendinea. The anterior most distal part of this muscle is partly attached to the basihyal bone and to the sides of the stylohyoid muscle near its insertion. Whether these little lateral slips of the serpi-hyoid are to be considered as a shifted origin, or as the result of an expanding broadened insertion, I am yet unable to decide.

M. stylo-hyoideus arises as a broad flattened-out band from the upper margin of the occiput, its origin being situated laterad from the end of the thyro-hyal or great cornu of the same side. The muscle then passes underneath (covered by) the parotic gland, crosses the two ribands of the genio-hyoideus of the same side, being directed obliquely forwards and inwards, and is inserted on the sides of the basihyal, laterally and dorsally from the greater cornu. This muscle, having its punctum fixum at the occiput, acts as the chief retractor of the tongue.

M. genio-hyoideus consists of two parts, both of which arise as narrow flat bands from the border and inner margin of the mandibles, being thus the most superficial muscles of all on the ventral side between the mandibles. The two bands pass directly backwards along the inner margin of the under jaw, then pass dorsally over the stylo-hyoid and serpi-hyoid. The median portion attaches itself to the distal three quarters of the cerato-branchial, by surrounding or enveloping this bone, being only loosely fastened to it by connective tissue. The outer part accompanies the cerato-branchial throughout its length on the dorsal surface, and is attached to its tip. Both these portions, constituting the genio-hyoid muscle, are surrounded by a common slippery sheath, which compels them to act exclusively in the direction of the bone.

The muscle has its punctum fixum at its origin at the mandibles, and consequently by its contraction protrudes the tongue. As the cornua of the tongue, surrounded by the genio-hyoid muscle, might be compared to a rod surrounded by an elastic steel spiral fastened to one end of the rod, it will be understood that the force with which and the extent to which the tongue can be propelled depends directly on the length of the cornua. This agrees with observation, e. g. *Trochilus* and *Picus* compared with *Zosterops*.

M. cerato-glossus. This muscle arises from the distal two thirds of the outer and upper aspect of the thyrohyal, and is attached to the ventral surface of the basihyal. By its contraction it causes the basi- and thyrohyals to be bent at an angle, and thus directs the tip of the tongue.

M. tracheo-hyoideus arises from the latero-ventral aspect of the upper part of the trachea, and is inserted into the dorsal surface of the end of the basihyal bone by the help of a long and slender tendon. This muscle acts as a retractor of the tongue when acting at the time with its fellow on the other side; but when acting singly it directs the tongue to the right or to the left.

PROSTHEMADERA.

The muscular apparatus of *Prosthemadera* exhibits some remarkable differences from the arrangement of the muscles described above.

The *mylo-hyoid* muscle is not attached to any part of the tongue, but (at least in my two specimens) is separated from it by a thick layer of fat. The posterior part of this muscle is fused with the apex of the triangular serpi-hyoid muscle, which likewise has no connexion with the tongue. The serpi-hyoid muscle arises by two slips:—first, behind the masseter, from the exoccipital bone; and, secondly, from the serpi-hyoid process. In the middle line there is formed a well-developed linea tendinea. This muscle is very strongly developed, and through its shape and the way of its breaking-up very suggestive regarding the formation of new, secondary muscles. It leaves a small empty space on each side, where there is a dead point.

A *stylo-hyoid* muscle is altogether absent.

The outer riband of the m. genio-hyoideus is inserted on the outer, not inner surface of the mandible. The change that the insertion of this muscle has undergone, if compared with its position in *Nectarinia*, is indicated, however, by a few muscular fibres which are still attached to the neighbouring part of the ventral edge of the mandible.

The *ceratoglossal* muscle arises from the lateral aspect of the basibranchial; its long tendon is inserted laterally into the anterior end of the os entoglossum and into the base of the two movable ossicles forming the continuation of this bone.

ZOSTEROPS resembles *Nectarinia*; but the stylo-hyoid is not developed as an independent muscle. It arises from the hinder angle of the mandible, and is completely united to and fused with the serpi-hyoid. This appears to me to indicate that the stylo-hyoid muscle is originally only the deeper layer of the serpi-hyoid.

CERTHIA agrees with *Zosterops*; but the combined stylo- and serpi-hyoidei are very feebly developed.

Besides these muscles, we have to consider others, which, although not in direct connexion with the hyoid apparatus, act indirectly upon it. They are tracheo-laryngeal muscles.

In PROSTHEMADERA we have the following:—

M. tracheo-laryngeus brevis et superior. It arises as a flat riband from the ventral side of the upper part of the trachea, and is inserted into the ventral aspect of the thyroid cartilage, a little to the side of the middle line. The contraction of this muscle will bend the upper larynx slightly downwards, and with it will lower the tongue.

A second pair of muscles is represented by a broad band, which more or less forms the continuation of the tracheo-hyoid muscle. It arises chiefly from the latero-ventral aspect of the upper third of the trachea, and is attached to some cutaneous muscles on the sides of the neck. In the majority of non-oscine birds it is inserted somewhere on the anterior border of the furcula, and is then, of course, a proper m. tracheo-sternalis.

Let us now consider how the various muscles of the upper larynx and the hyoid apparatus act, and how the peculiar tongues of the Tenuirostres are made use of.

The contraction of the mylo- and serpi-hyoid muscles presses the whole tongue and larynx upwards against the palatal roof of the mouth-cavity. The mouth is thus wholly filled up. Through the contraction of the genio-hyoid muscles the tongue will be protruded from the mouth. Now, if the serpi-hyoid and mylo-hyoid muscles relax, and the tracheo-laryngeus and tracheo-hyoideus, on the other hand, by their contraction depress the larynx and at the same time depress the posterior part of the tongue, a vacuum will be produced between tongue and palate. This space, again, is in connexion with the tubes of the tongue, and therefore will be filled by the fluid into which the tips of these tubes may be inserted. In the birds in question the fluid is honey or nectar. Consequently sucking is accomplished automatically through the mere protrusion of the tongue. It is clear that this process is very simple in the Trochilidæ with their complete tubes; but they will not be able to suck if there is not fluid enough to fill the whole of the anterior opening of the tubes, since air would rush in instead of nectar. This eventual inconvenience seems to me to be prevented or overcome by the anterior portion of the tubes being broken up into vibrissæ or into a brush, as we saw was the case with the *Meliphagince* and *Nectariniince*. The nectar will then ascend to the tubular portion by capillary attraction; or the brush may be moistened or soaked with nectar like a sponge, and the nectar may then be sucked up into the tubes. This process finds an analogue in the proboscis of Bees and Butterflies.

EXPLANATION OF PLATE XVI.

s.h, Serpi-hyoid; *m.h*, mylo-hyoid; *st.h*, stylo-hyoid; *g.h*, genio-hyoid; *c.g*, ceratoglossal; *tr.h*, tracheo-hyoid; *tr.st*, tracheo-sternalis; *tr.l*, tracheo-laryngeus; *tr*, trachea; *b.h*, basihyal; *u.h*, urohyal.

Fig. 1. *Nectarinia splendida*. The mylo-hyoid and serpi-hyoid muscles are removed.
2. *Zosterops lateralis*. Ventral view, after the removal of the mylo- and serpi-hyoid.
3. *Nectarinia splendida*. Ventral view of the muscles between the mandibles, after removal of the skin.
4. *Nectarinia splendida*. The same as in fig. 3, after removal of the serpi- and genio-hyoids, to show the connexion of the mylo-hyoid with the soft transversely folded part of the tongue's sheath.
5. *Trochilus*, sp. Semidorsal view, to show the genio- and stylo-hyoid muscles curving round the skull.
6. *Prosthemadera*. Ventral view, after removal of the mylo- and serpi-hyoid.
7. The same as in fig. 6; but the whole apparatus of the tongue is bent backwards and downwards to show the anterior end of the larynx.
8. *Anthothreptes malaccensis*. Dorsal view of the right tube of the tongue.
9. *Cinnyris auriceps*. Dorsal view of the left tube.
10. *Anthothreptes subcollaris*. Ventral view of the tubular part of the tongue.

4. Description des espèces nouvelles dela collection péruvienne de M. le Dr. Raimondi de Lima. Par L. Taczanowski, C.M.Z.S.

[Received February 20, 1883.]

(Plate XVII.)

Dans une riche collection d'oiseaux péruviens que M. le docteur Raimondi, le savant explorateur du Pérou, a eu l'obligeance de me communiquer, pour m'en servir au travail sur la faune ornithologique de la République péruvienne, dont je suis occupé depuis plusieures années, j'ai trouvé 7 espèces qui me paraissent être inédites. Je m'empresse donc à présenter leurs diagnoses.

1. Carenochrous seebohmi, sp. nov.

C. *supra ardesiacus ; fronte, superciliis latissimis lorisque nigris ; pileo cum nucha fusco-castaneo ; macula postnasali alba ; regione auriculari ardesiaca ; gula cum collo antico pectoreque supero latissime albis ; mystacibus tenuissimis nigris ; pectore infero, hypochondriisque griseo-ardesiacis ; abdomine medio albido, postice ochraceo perfuso ; subcaudalibus ochraceis ; alis caudaque schistaceis, plumis colore dorsi externe limbatis ; subalaribus, remigum marginibus internis et primi remigis margine externo albis. Rostrum supra brunneum, subtus flavidum ; pedes brunnei ; iris brunnea. Long. alæ 76, caudæ 71, rostri 17, tarsi 29 mm.*

Hab. Cajacay, provinciæ Cajatambo.

Espèce la plus voisine des *C. schistaceus, castaneifrons*, et *taczanowskii*, mais se distinguant de toutes par le front noir, la couleur blanche largement disposée sur le devant des parties inférieures du corps, par les moustaches noires beaucoup plus fines et beaucoup plus courtes, les sous-caudales ocreuses, la couleur du dos moins foncée, la queue non étagée et distinctement rayée à travers d'une nuance plus foncée et le bec plus long. En outre du premier par le manque complet du miroir blanc ; du deuxième par la présence de la tache blanche sur les deux côtés du front ; du dernier par la région auriculaire non noire.

2. Carenochrous dresseri, sp. nov.

C. *supra ex brunneo griseus ; fronte, superciliis latissimis lateribusque colli nigris ; pileo medio pallide rufo ; loris et regione suboculari nigricantibus ; macula magna postnasali alba ; regione auriculari grisea ; gula latissime isabellino-albida, mystace nigro tenui utrinque marginata ; pectore abdomineque medio isabellinis, hypochondriis late griseis, subcaudalibus ochraceis ; alis caudaque ardesiacis, speculo alari magno, subalaribus et marginibus internis remigum albis. Rostrum fusco-corneum ; pedes pallide brunnei. Long. alæ 61, caudæ 62, rostri 13, tarsi 23 mm.*

Hab. Montaña (forêt) de Nancho (*coll. Jelski*).

Espèce la plus voisine du *C. leucopterus* de l'Ecuadeur, mais di-

Le crâne du mâle est en général beaucoup plus massif que celui de la femelle; presque chacune de ses parties diffère de celle de la femelle. Surtout la différence est frappante dans l'angle de la partie antérieure de la tête; le processus dentiformis est plus robuste, ainsi que l'éminence sur la limite entre les os pariétaux et les frontaux.

La surface du crâne de la femelle est lisse; les parties antérieures moins épaisses, la carène supérieure sur les os intermaxillaires plus aiguë, la hauteur moins grande de ces os, une forme différente de l'os zygomatique, et des processus zygomatiques, des os de la mâchoire et des temporales. La mandibule de la femelle est moins large sur sa surface antérieure, plus courbée sur la supérieure, les angles postérieurs plus rapprochés entre eux.

Me basant sur l'analogie avec les autres mammifères voisins, je suppose que les mâles étaient plus gros et d'une structure plus forte, à os plus developpés. Les Aléoutes distinguent ces crânes en donnant le nom de "Byk" (taureau) à ces crânes d'une construction plus forte, à os plus developpés, ou simplement "bytschutsche" (ceux du taureau).

Les squelettes que se trouvent dans les musées sont composés d'os pris pour la plupart des différents individus, et je suppose que quelques-uns des mâles portent une tête de femelle et *vice versa*[1].

March 6, 1883.

Prof. Flower, LL.D., F.R.S., President, in the Chair.

The Secretary read the following report on the additions made to the Society's Menagerie during the month of February 1883.

The total number of registered additions to the Society's Menagerie during the month of February was 88, of which 16 were by birth, 30 by presentation, 23 by purchase, 1 was received in exchange, and 18 on deposit. The total number of departures during the same period by death and removals was 92.

The following additions are of special interest:—

1. A female Panolia Deer (*Cervus eldi*) from Siam, received in exchange from the Jardin d'Acclimatation, Paris, February 10th.

The only previous specimen of this Deer in the Society's collection was the male presented by Mr. A. Grote, F.Z.S., in 1867 (see P. Z. S. 1867, p. 821).

2. A young male Thar (*Capra jemlaica*), presented by Lieut.-Col. Alex. A. A. Kinloch, C.M.Z.S., February 17th.

We are specially obliged to Col. Kinloch for sending us this animal, as we have two females, mother and young[2], already in the collection, and a male is consequently most acceptable.

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[1] [Nous nous sommes convaincus avec M. Slosarski d'après les figures et cette courte description du Dr. Dybowski, que le beau crâne qu'il a envoyé précédemment au Musée de Varsovie est d'un mâle avec la mandibule de la femelle.—L. T.]

[2] See P. Z. S. 1880, p. 186.

3. A male Blyth's Tragopan (*Ceriornis blythi*), presented by Capt. W. Brydon, of the 42nd Assam Light Infantry, and received through the kind mediation of the Zoological Gardens, Calcutta, February 17th.

The only example of this splendid species previously received was that presented by Major Montagu in 1870[1].

The Secretary exhibited, on behalf of the Rev. F. O. Morris, a drawing of a bird shot in Hampshire in November 1882, and lately described in 'Land and Water' (vol. xxxv. p. 90, 1883), and remarked that, as there suggested, it certainly represented a Tinamou, (perhaps *Nothura boraquira*), which must have escaped from captivity.

Mr. J. E. Ady exhibited some microscopical preparations of bone, in one case showing the growth of blood-vessels into cartilage previous to ossification, and in another case presenting a hard section in which the lacunæ and canaliculi were extremely well shown.

Dr. Hans Gadow, C.M.Z.S., communicated an outline of a series of observations, which he is now undertaking, on the arrangement and disposition of the muscles of the avian syrinx. He directed especial attention to the fact that there is an absolute continuity between these muscles and those of the upper larynx and the hyoid apparatus. The innervation of all these parts was found to be hypoglossal pharyngeal, the special nerve-branches accompanying the trachea throughout its length. He pointed out that the conclusion to be drawn from these facts was that the syringeal muscles are derived from the system of sternohyoid muscles.

The stages intermediate between the arrangement seen in certain birds, where some of the muscles of the upper larynx have no connexion with the skin, and in others, in which the same muscles come into close relation with the integument, were explained with the aid of diagrams. Dr. Gadow had, in consequence, been led to believe that at least such of the cutaneous muscles in the cervical region as are striped belonged primitively to the common layer of skeletal muscles.

Some difficulties in the characters of the nerve-supply of these parts, cervical as well as hypoglossal nerves taking a share in this duty, were pointed out; and further investigations on this obscure point were said to be in hand.

The following papers were read:—

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[1] P. Z. S. 1870, p. 162, pl. xv.

1. Descriptions of new Species of Beetles belonging to the Family *Erotylidæ*. By Henry S. Gorham, F.Z.S.

[Received March 5, 1883.]

(Plate XVIII.)

Three years ago I had the opportunity of comparing with a portion of my own collection of *Erotylidæ* the one formed by the late G. R. Crotch and now in the Museum of Natural History at Cambridge. It is well known that my friend, with whom I spent many pleasant hours in their examination, spared no time or trouble in both acquiring and collating the types in those museums and private collections which he was able to reach. In the present paper it is my object to describe some very conspicuous species which have come into my own possession, from various sources, some from the private collection of Mr. G. R. Waterhouse, some from the collection made in the Philippines by Herr C. Semper, and others from the last collection brought by Mr. Buckley from Bolivia and Peru.

I have commenced with the *Encaustini*, with which it appears to me a linear arrangement should be headed. Their largely developed and powerful form, which is at least as much specialized as the genera placed before it by Lacordaire, seems to me of more importance than a recondite structure of the maxillæ. The genus *Aulacochilus*, again, is unnaturally separated by Lacordaire from *Episcapha*, to which I have here placed it in proximity. The present paper contains only an instalment of the new species known to me; the *Langurini*, *Triplacini*, and *Erotylini* proper must be left for a future time.

List of new Species.

1. *Encaustes crotchi*. Philippine Islands.
2. *Micrencaustes torquatus*. West Africa.
3. —— *plagiatus*. Java ?

Hybosoma, genus novum.

4. *Hybosoma hydropicum*. Philippine Islands.
5. —— *striatum*. Philippine Islands.
6. —— *tetrastictum*. Philippine Islands.
7. *Megalodacne imperatrix*. South-east Africa.
8. —— *furcata*. West Africa.
9. *Triplatoma philippinensis*. Philippine Islands.
10. —— *andamanensis*. Andaman Islands.
11. —— *gestroi*. Borneo, Sumatra.
12. —— *brahminica*. India, Assam.
13. —— *siva*. India, Assam.
14. *Episcapha semperi*. Philippine Islands.
15. —— *cordata*. West Africa.
16. *Episcapha difficilis*. Andaman Islands.
17. —— *octopustulata*. Philippine Islands.
18. —— *piciventris*. West Africa.
19. *Aulacochilus inclytus*. Philippine Islands.
20. —— *agaboides*. Philippine Islands.
21. —— ——, var. ? *furciferus*. Philippine Islands.
22. —— *episcaphoides*. Andaman Islands.
23. *Pselaphacus mysticus*. Peru, Chancomayo.
24. *Megischyrus elongatus*. Peru, Chancomayo.
25. —— *bartletti*. Peru, Chamicuros.
26. *Ischyrus peruvianus*. Peru.
27. —— *grammicus*. Peru, Chancomayo.
28. *Lybas* ? *dorsalis*. Peru, Chamicuros.
29. *Palæolybas cychramoides*. West Africa, Camaroons.

1. Encaustes crotchi. (Plate XVIII. fig. 7.)

Niger, nitidus; capite distincte parce punctato, prothorace subquadrato immaculato, elytris lævibus punctis haud discretis, interstitiis obsoletissime costatis, maculu humerali transversa alteraque triente ante apicem fulvis.

Long. 22 millim. ♀.

Hab. Philippine Isles, Bohol (*Semper*).

The wholly black thorax will separate this from any of its allies: the species to which it comes nearest is *E. humeralis*, Crotch, with which it agrees in having a red spot *on each shoulder*, touching the base of the elytra. Crotch's specimen of *E. humeralis* is from New Guinea; I have a second specimen from the Philippine Islands taken by Semper at Pulobatu, which I have compared with the type at Cambridge and believe to be identical.

2. Micrencaustes torquatus. (Plate XVIII. fig. 5.)

Niger, nitidus, verticis puncto, prothoracis macula irregulari, elytrorum annulo humerum subcingente retrorsum ramos duos emittente, lunulaque infra medium fulvis.

Long. 16 millim.

Hab. Africa occid., Old Calabar (*coll. Murray*).

Allied to *M. sinuatus*, Lac., but differing in being rather longer and narrower, in having the sides of the thorax scarcely rounded but narrowing a little in front, the disk distinctly punctured (in some examples of *M. sinuatus* a fine sparse puncturing is visible), and especially in the form of the humeral ring, which surrounds a much smaller space, in fact only the humeral callus, and emits a branch backwards towards the scutellum, and another obliquely towards the middle of the elytra. The posterior crescent is strongly recurved. The elytra exhibit very obsolete fine rows of punctures, which are quite invisible in *M. sinuatus*. A single specimen, marked *Encaustes* n. sp. by Crotch, from Murray's collection, now in my possession.

3. Micrencaustes plagiatus.

Niger, parum nitidus, capitis vertice, thoracis macula utrinque difformi, elytrorumque basi indeterminate, vitta submarginali, et macula apicali intra marginem sanguineis; prothorace valde convexo, angulis anticis acutis paululum productis, posticis subrectis.

Long. 17 millim.

Hab. Java?

Allied to, but amply distinct from, *M. lituratus*, MacLeay. The prothorax is quite of a different shape, not narrowed in front, the base not wider than the front, but the sides more rounded; the red mark on each side is also different in shape, having three distinct branches like that in *Encaustes verticalis*.

The elytra are not punctured in series, and the red patch at the base united with the apical patch by a stripe along (but not touching) the margin will readily separate this species from *M. lituratus* or any other described species.

There is a single example in my own collection; but I am not certain of the locality.

HYBOSOMA.

Genus inter Coptengem *et* Triplatomam *quasi intermedium.*

Antennæ quam caput et thorax longiores, articulo tertio, quarto æquali; clava longa; oculi fere integri. Prothorax lateribus paululum incrassatis, subquadratus, basi bisinuata haud emarginata; prosternum latum, apice truncato depresso, haud declivo; mesosternum quadratum. Elytra gibbosa, apicibus subdepressis subtruncatis.

This is a genus apparently resembling *Plagiopisthen*, differing from it in having much longer antennæ, in the eyes being not so strongly margined, and the angles of the thorax in front not being so produced. Its nearest ally is really *Coptengis*, from which it differs in its less cylindrical form, in the eyes not having a keeled process of the head in front, rendering their edge emarginate, in the proportion of the third joint of their antennæ, in the prosternum being simply truncate instead of its apex having two blunt lanceolate points, and in having strongly convex gibbous elytra.

The prothorax is sometimes (*H. striatum*) wider than the elytra; the latter are four-spotted in all the species yet known to me; and these have a strong likeness to those species of *Eumorphus* which have unmargined elytra. I cannot at present observe the sexual difference.

I have only seen it from the Philippine Isles.

4. HYBOSOMA HYDROPICUM. (Plate XVIII. fig. 6.)

Nigrum nitidissimum, confertim subtiliterque punctatum, elytris tenuiter striato-punctatis, macula transversa humerali fasciaque arcuata pone medium, nec marginem nec suturam attingente, aurantiacis, abdomine crebre haud profunde punctato.

Long. 15 millim.

Hab. Philippine Isles, Bohol (*Semper, Cuming, Thelland?*).

Head, thorax, and prosternum very finely and very thickly covered with fine punctures, only visible under a strong lens. Thorax wide, in one example rather wider than the elytra; the latter strongly bulged and longitudinally gibbous, attenuated towards the tip. Antennæ longer than the head and thorax, their club quite as long as the five preceding joints. Legs long, femora not very clavate, much as in *Coptengis*.

5. HYBOSOMA STRIATUM.

Nigrum, nitidissimum, crebre confertim punctatum, elytris fortius punctato-striatis; macula humerali fasciaque arcuata nec marginem nec suturam attingente aurantiacis; antennæ thoracem vix superantes.

Long. 15 millim.

Hab. Philippine Isles, E. Mindanao (*Semper*).

Closely allied to the preceding, perhaps not distinct; the elytra, however, are very much more distinctly punctate-striate, and the antennæ are not so long. The head is distinctly punctured, with deeply impressed but irregularly shaped points, the interspaces being finely alutaceous; there is a semicircular impression between the bases of the antennæ, and two wide foveæ behind. The mentum is wide and but little rounded, subtruncate in front. The thorax is rather longer than wide, of nearly equal width in front and behind, varying in this respect probably sexually; both front and hind angles are acute, but not much produced. The elytra have the striæ arrested on the yellow spots, and the basal ones are a little tumid. The underside is scarcely punctured; but the prosternum is very finely transversely wrinkled. I have seen this species in the British Museum.

6. HYBOSOMA TETRASTICTUM.

Nigrum, nitidissimum, omnino confertim subtiliter punctatum, antennis thoracem haud superantibus; elytris convexis gibbosis, subtilissime punctatis, haud striatis, macula humerali lunulaque pone medium aurantiacis.

Long. 15 millim.

Hab. Philippine Islands, Leyte (*Semper*).

This species is allied rather closely to both those preceding, but has no trace of striation, and the elytra are more inflated behind the middle than in either of them. The thorax is slightly narrowed behind, so that both the basal and front margins are narrower than the middle. The sculpture of the underside is similar to that of *H. striatum*.

I have only seen two specimens—the one in my own collection, which I consider referable to this species, taken in the island of Leyte, and one which I obtained from Mr. Higgins, but without any other locality than Philippine Islands.

7. MEGALODACNE IMPERATRIX. (Plate XVIII. fig. 8.)

Nigra, nitida, elongato-ovata, thorace utrinque litura fulva, elytris annulo lato humerum subcingente, extus quadridentato, fasciaque interrupta pone medium, parum curvata, utrinque dentata, fulvis.

Long. 22–28 millim.

Hab. S.E. Africa, Mamboia.

Head and thorax very finely punctured, the base of the head more sparsely and deeply so; club of the antennæ obliquely rounded at the apex; the third joint equal to the three following.

Thorax transverse, front and hind angles acute but not produced; a triangular fossa on each side of the base is rugose; the surface between the scattered punctures is finely alutaceous, sides finely margined, as is the base as far as the fossa. Elytra with three or four series of punctures visible at the base. Prosternum keeled but not acutely, nor produced in front, not punctured, but finely wrinkled throughout.

8. Megalodacne furcata.

Nigra, nitida, capitis basi parce sat profunde punctata, elytris obsolete punctato-striatis, singulis maculis duabus flavis, una humerum subcingente, extus denticulis duobus parvis ramoque parvo, altera versus apicem arcuata, apicibus et dente in medio retrorsum acute productis.

Long. 18–19 millim.

Hab. W. Africa: Isabu, Old Calabar, &c.

Closely allied to *M. grandis*, and equal to the smaller individuals of that species in size, but easily distinguished by the colour of the markings on the elytra being pale yellow instead of orange-red, and by their form: they are much less diffused, and narrower; of the humeral one the "ramus" or branch which turns towards the suture is much less developed, being in fact only a tooth-like projection; the hinder one is an arcuate fascia, much produced behind at the margin, and with two teeth on the apical side near the suture. The basal side of this fascia is almost even.

The thorax is rather more opaque than in *M. grandis*, the elytral puncturing rather more definite.

9. Triplatoma philippinensis. (Plate XVIII. fig. 3.)

Nigra, nitida, vix punctata, prothorace oblongo, parum attenuato, ad angulos anticos guttis duabus sinuatis postice acuminatis rubris; elytris singulis striis tenuissimis obsolete punctatis septem, fasciis duabus ad suturam late interruptis, haud profunde dentatis, maculaque parva ante apicem rubris.

Long. 16–18 millim.

Hab. Philippine Islands, Mindanao (*Semper*).

The only species to which this can well be compared is *T. attenuata*, Crotch, from which it differs by its smaller size, by the form of the thoracic stripe near the front angles, which is here curved, wide in front and acuminate behind. The third or apical fascia is here reduced to an indented triangular spot. I have only received two specimens.

10. Triplatoma andamanensis. (Plate XVIII. fig. 2.)

Nigra, parum nitida, subparallela, capite prothoraceque minute punctatis, hoc basi apiceque æqualiter latis, ad angulos anticos macula rufa trapeziformi, retrorsum exciso; elytris fasciis duabus rectis, una basilari, altera subapicali, utrinque dentatis, rufis, singulis striis tenuissime punctatis fere obsoletis sex.

Long. 15 millim.

Hab. Andaman Isles.

Readily distinguished by its small size, and by the *two* fasciæ similar to those in *T. sexnotata*, but which are yellow instead of blood-red, by the thoracic angular mark being a squarish spot indented on its posterior margin, and by its punctured striæ, which are more deeply impressed upon the elytra than in *T. sexnotata*.

In my own and Mr. G. Lewis's collections.

11. TRIPLATOMA GESTROI. (Plate XVIII. fig. 1.)

Triplatoma gestroi, Bedel, Ann. del Mus. Civ. di Genova, 1882, p. 440, t. x. f. 4.

Nigra, parum nitida, prothorace subquadrato limbo laterali subincrassato, rubro variegato, subopaco; elytris distincte striatis, striis obsolete punctatis, striga subhumerali fasciisque tribus valde undulatis haud bene discretis rufis; femoribus rufo-cinctis.

Long. 15-17 millim. ♂ ♀.

Mas. *tibiis anticis sinuatis, ad apicem torsis, intus carinatis.*

Hab. Borneo, Sarawak (*Wallace, coll. Lewis and Gorham*, ♂). Sumatra (*Leyden Mus.*, ♀).

[Since this paper has been read, and the plate drawn, I have received one by M. Louis Bedel, published in the 'Annals of the Civic Museum of Natural History of Genoa' in December 1882, in which he has submitted the genera *Coptengis*, *Triplatoma*, and *Plagiopisthen* to revision. The genus *Triplatoma* is subdivided and its form changed to *Triplotoma*, which is retained for *T. picta*, *gestroi*, and *cypræa*. *T. gestroi* appears to be identical with the species which I have described and figured here, and to which I had given another name. I have seen specimens of this species since in the British Museum and in the possession of Mr. S. Olliff. The new genera proposed are *Trichulus* for *pubescens*, Cr., *Eudytus* for *bizonatus*, Cr., *Nesitis* for *attenuata*, Cr., *Linodesmus* for *cæcus*, F. *Trichulus* and *Linodesmus* are certainly geographical forms and better separated; but the remainder seem formed rather on specific than generic differences, a process of subdivision to which most genera of moderate size are equally liable, without any evident advantage being secured.—H. S. G., April 10th, 1883.]

12. TRIPLATOMA BRAHMINICA.

Nigra, parum nitida, supra opaca; prothorace oblongo, crebre et distincte punctato; elytris fortiter sulcatis, interstitiis costatis, sulcis punctatis, fasciis duabus angustis, undulatis, rufis, una subbasilari, altera subapicali.

Long. 21 millim.

Hab. India, Assam.

Head and thorax opaque, thickly covered with shallow but distinct round impressed points, under surface of the thorax nearly smooth, but the prosternum transversely wrinkled, its apex foveate. Elytra evenly and deeply sulcate, the intervening costæ smooth and shining, eight in number, uniting near the apex, the fifth and sixth costæ uniting some distance higher up, and also joining the fourth. The humerus obsolete, the apex expanded, subtruncate. Allied to *T. picta*, Perty; distinguished immediately by the black thorax and two fasciæ, deeper sulcation, &c.

13. TRIPLATOMA SIVA.

Nigra, parum nitida, capite prothoraceque vix punctatis, fere alutaceis; elytris subsulcatis, sulcis obsolete punctatis, annulo *humerali fasciaque subapicali, ramos undique emittentibus per costas provectos et ad apicem conjunctos, flavis.*

Long. 21 millim.

Hab. India, Assam.

The head and thorax in this species are very much less opaque, and not punctured as in *T. brahminica.* The thorax is shorter, and its sides more rounded. The elytra are sulcate; but the punctures, which in *T. brahminica* are very distinct, are here obsolete; the costæ are rounded. The variegated appearance is formed by long branches from the humeral and subapical fasciæ which run along the alternate costæ; they do not unite in the single example I have seen, except at the apex, where three unite in an indistinct way, but are no doubt subject to variation. The black round humeral spot is distinct; but the shoulder itself is obsolete as in the allied species.

14. EPISCAPHA SEMPERI.

Nigra, nitida; capite obsolete punctato, prothorace subtilius minus distincte punctato; elytris tenuiter minute punctato-striatis, macula humerali subtrapeziformi fasciaque pone medium suturam non attingente leviter arcuata læte aurantiacis, callo humerali nigro.

Long. 15 millim.

Hab. Philippine Isles, E. Mindanao (*Semper*).

Very near *E. sublævis*, Crotch; but the punctured striæ will distinguish it. The prosternum is broadly expanded behind, and excavated (but not so deeply as in *E. octonotata*) at its apex; it is also rather strongly margined behind the middle; it is punctured on each side, but the ridge is smooth. The meso- and metasternum and the abdomen are free from punctuation.

There are two specimens in my collection, taken by Mr. Semper from East Mindanao, and a third, smaller specimen from Luzon, which is I believe referable to the same species.

15. EPISCAPHA CORDATA.

Nigra, subnitida, antice posticeque attenuata, infra rufo-picea, capite prothoraceque crebre et minute punctatis; elytris obsolete substriatis, fascia humerali subrecta interne attenuata, utrinque dentata, alteraque ante apicem leviter arcuata flavis.

Long. 8 millim.

Hab. West Africa, Old Calabar (*coll. Murray*).

From *E. piciventris* this differs in its smaller size, in being more pointed behind, in the whole of the underside being more or less pitchy, which colour extends even to the legs and antennæ, and in the form of the fasciæ, the basal one being straighter and the hinder one less arcuate, and not produced at the suture or margin. It is observable that the hind fascia in *E. senegalensis* is nearer the apex and broader than in either of these species, and is moreover of a deeper blood-red colour. The posterior process of the prosternum is more elongate; and its marginal lines meet in front, whereas in *E. piciventris* they are lost in the side of the ridge before meeting.

16. EPISCAPHA DIFFICILIS.

Nigra, nitida; capite prothoraceque parcius et sat profunde punctatis; elytris singulis striis septem, leviter impressis, crebre minute punctatis, fasciis duabus interruptis, una basali utrinque dentata, altera ante apicem, læte rufis.

Long. 7–8 millim.

Hab. Andaman Islands (*coll. Gorham*).

This species at first sight so very closely resembles *E. senegalensis*, Lap., = *E. interrupta*, Lac., that it will suffice to point out the distinction. The head and thorax are more shining and more sparsely and more deeply punctured. The elytra have seven distinct although very fine punctured striæ; in *E. senegalensis* striæ are not visible, but the elytra are punctured all over, and are subsulcate only at the apex. The basal fascia does not run obliquely up to the shoulder, where in *E. senegalensis* it is widest, but runs straight across, emitting a single tooth towards the base. It is more convex than the African species, and is more brightly coloured.

A third species even more closely allied to *E. senegalensis*, if not the same, occurs in India.

17. EPISCAPHA OCTOPUSTULATA. (Plate XVIII. fig. 4.)

Nigra, nitida, supra valde convexa; capite sat fortiter crebre punctato; prothorace parcius et subtilius punctato, ad angulos anticos macula rotundata aurantiaca; elytris sublævibus, maculis duabus subhumeralibus (interiore majore) alteraque magna transversa ante apicem aurantiacis.

Long. 15 millim.

Hab. Philippine Isles, E. Mindanao (*Semper*).

This is unlike any other *Episcapha* known to me, in having the thorax spotted; and its convex look would have led to me to make a new genus for it, but I fail to find any valid characters by which to separate it. The prosternum is almost angularly cut out at its posterior margin, but it is almost equally so in *E. semperi*; it is compressed in front into a blunt point, and is roughly punctured, but the epipleuræ are smooth. The form of the mesosternum is somewhat peculiar: it is compressed in front so as to form a subtriangular table, with its apex in front, and rounded, fitting the excavation of the prosternum. Metasternum obsoletely punctate.

18. EPISCAPHA PICIVENTRIS.

Nigra, subnitida; capite prothoraceque subtiliter alutaceis, crebre et minute punctatis; elytris obsolete striato-punctatis, fascia humerali subobliqua, sutura interrupta, utrinque dentata, lunulaque subapicali valde arcuata flavis; abdomine rufo-piceo.

Long. 10–11 millim.

Hab. Old Calabar (*coll. Murray*).

This species is a little larger than any *E. senegalensis* I have seen, and is at once separable from that species by the delicate punctured striæ, as well as the narrow fascia and by the hinder one being arcuate. It is more nearly allied to the species standing in

Murray's collection and named by Crotch *E. obliquata*: it is only half the size of that species; the striæ are much more obsolete. The whole of the abdomen is rufous; and the posterior fascia is recurved more on the margin and less on the suture. The distinction of the alutaceous surface of the thorax appears to me also to be a good character.

Two specimens in Murray's collection, purchased by me, are labelled n. sp. in Crotch's handwriting.

19. Aulacochilus inclytus.

Niger, supra cærulescens, nitidus, capite thoraceque fere glabris; elytris valde convexis, singulis maculis duabus magnis subrotundatis fulvis, striis obsoletissime punctatis, fere obliteratis.

Long. 10½–11 millim.

Hab. Philippine Islands, Panaon (*Semper*).

This species is distinguished from all its congeners (except *A. doriæ*) by having four large subquadrate or roundish red spots, of which the hinder one is not arcuate, on its elytra. Of these this one is separable by the blue shining thorax, which is scarcely visibly punctate; the head has a few scattered punctures, which are distinct under a good glass. The elytra are somewhat cordate; the front spot touches the base and just reaches the scutellum, it leaves the humeral callus and margin black; the hind spot is squarish, sometimes transverse, very nearly reaching the suture and margin. The underside is almost or quite black, without any of the blue tint observable in the whole upper surface.

This species is not in the Crotch collection at Cambridge.

20. Aulacochilus agaboides. (Plate XVIII. fig. 10.)

Ovatus, niger, nitidus; capite distincte, thorace minute haud profunde punctatis; elytris tenuiter punctato-striatis, singulis maculis duabus, una basilari intus tridentata, altera ante apicem valde arcuata; abdomine rufo, segmento basali nigro.

Long. 8 millim.

Hab. Philippine Islands, E. Mindanao, N. Luzon (*Semper, Cuming*).

The ground-colour of this species is quite black; the basal spot occupies the whole base, extending in an oblique direction from the scutellum across the shoulder, but leaving the reflexed edge of the margin black; it emits three rather long denticulations, between the first and second of which it is excavated rather deeply; the hind spot is undulated on its basal, produced on each side of its apical margin; both the spots are usually pale yellow. The elytra are finely punctate-striate, the interstices very finely, scarcely visibly punctate; the abdomen pitchy-red excepting its basal segment, or very nearly quite black. I have seen one specimen of this in the Crotch collection at Cambridge.

The specimens taken by Cuming were obtained by me from Mr. Waterhouse's collection.

21. Aulacochilus agaboides, var.? furciferus. (Plate XVIII. fig. 11.)

A. agaboidi *similis at paullo major, macula basali cum lunula subapicali per vittam discoidalem conjuncta.*

Long. 9½ millim.

Hab. Philippine Islands, N.W. Luzon (*Semper*).

If this is only a variety of the species already described as *A. agaboides*, it would still be an advantage that it should have a separate designation; but I think it will very probably prove to be a constant form. The basal yellow mark is of the same shape; but its second and third teeth are lost in the conspicuous vitta which unites it with the posterior lunule. This mark has its points so strongly recurved as to form three quarters of a ring. A single specimen is in my collection; and I have not seen it elsewhere.

22. Aulacochilus episcaphoides. (Plate XVIII. fig. 12.)

Oblongo-ovatus, parum nitidus, nigro-subcyaneus; capite profunde, thorace obsoletius sed crebre punctato, alutaceis, hoc antice angustato lateribus paululum reflexis; elytris tenuiter punctato-striatis, interstitiis obsolete crebre punctatis, macula magna baseos, punctum nigrum includente, fasciaque lunulata nec suturam nec marginem attingente sanguineis.

Long. 9 millim.

Hab. Andaman Isles.

Less convex than usual for the species in the genus, nor so much attenuated in front and behind as is generally the case. The general form is that of *A. sericeus*, Bedel, to which section of the genus the present species belongs. It may be recognized from any described species by the black round spot, which is surrounded by the red basal patch. This patch has three short branches externally, one towards the base and one towards the outer margin, between which is the callus; there is a third short branch at the outer posterior angle. The posterior lunule has rather the appearance of a double united spot, both sides being indented.

23. Pselaphacus mysticus.

Niger, nitidus, thorace seriebus duabus punctorum; elytris fortiter punctato-striatis, macula basali bifida, fasciis tribus undulatis, posteriore ramum ad apicem emittente et cum fascia secunda conjuncta lineaque submarginali fulvis; tibiis anterioribus curvatis, ad apicem ampliatis, intus crenulatis.

Long. 14–17 millim.

Hab. Peru, Chancomayo. ♂.

Allied to *P. curvipes*, but very much more shining, and differing in pattern, having three transverse fasciæ besides the basal bidentate mark, of which the two posterior are joined near the suture by a straight band. In some varieties of *P. curvipes*, viz. in my examples of the variety named *gracilis*, the third fascia has a stripe uniting it with the apex; but this stripe (which is present in *P. mysticus*) starts from the middle of the fascia, which is there angulated *towards the apex*. The abdomen is not punctured as in *P. curvipes*, on each side. The front tibiæ in the male are more suddenly dilated below the middle, and their inner sides above the middle are distinctly crenulated. Three specimens.

24. MEGISCHYRUS ELONGATUS.

Saturate sanguineus, parum nitidus; prothorax subopacus limbo laterali nigro; elytris postice gradatim attenuatis, callo humerali, maculis duabus obliquis (interiore majore in medio constricto) dimidioque apicali nigris.

Long. 15–17 millim.

Var. *Supra totus saturate rufus, elytris callo humerali maculisque duabus obliquis tantum nigris.*

Long. 17 millim.

Hab. Peru, Chancomayo.

A very distinct species, to be recognized by its very narrow elongate form. It is widest at the shoulders, the thorax narrowing in front with nearly straight sides, and the elytra gradually tapering behind. The colour appears variable: in the three specimens before me two have the apical half of the elytra black. In one of these the head and body beneath is *almost* black, while the thorax is very obscurely red, yet with black lateral margins. In the other the head and thorax are more decidedly red; while in the third example the colour above is light brown, with only the three elytral spots and the lateral margin narrowly black. The tibiæ and extreme tips of the femora are black in all of these three specimens.

It should be placed near *M. bellicosus*.

25. MEGISCHYRUS BARTLETTI. (Plate XVIII. fig. 9.)

Niger, subnitidus; elytris striatis, striis obsolete punctatis, fasciis quatuor maculis alternis distinctis lineaque submarginali flavis.

Long. 17 millim.

Hab. Peru, Chamicuros (*Bartlett*).

Elongate, sides of the elytra rather parallel; head and prothorax slightly shining but without punctures, the latter with four deep impressions upon its disk, possibly accidental. The elytra have four fasciæ—one basal, the second and third nearly straight, the fourth formed of longer spots and diverging at the suture. These fasciæ are formed of five or six elongate square marks separated by the obsolete punctures, which are indicated by fuscous marks. There is a sutural yellow line at the base and apex.

This species somewhat resembles *M. bogotæ*, Crotch: it is more shining; and the fourth fascia will distinguish it at once. I have only seen a single specimen, which was sent me by Mr. E. Bartlett, by whom it was collected in Peru.

26. ISCHYRUS PERUVIANUS.

Elongatus, subcylindricus, nitidus, flavus, subtus nigro et ferrugineo variegatus; capite, thoracis disco punctis quatuor transversim dis-

positis, duobus in margine antico, elytrorum macula magna scutellari, altera parva infra humerum, puncto huic approximato, fascia pone medium in sutura lata, ad marginem attenuata, limbo tenuiter, apice latius nigris; pedibus fulvis, femorum basi et genibus nigris.

Long. 9½ millim.

Hab. Peru.

This species so far resembles *I. 4-punctatus* that it will be sufficient to mention the characters which amply justify its distinction from that North-American species. Its form is longer, and its size larger; the thorax, in addition to four spots, has two on the front margin, and its base is not black.

The elytral markings, though similar, are all different in shape; the narrow mark below the callus is on the margin; and a round spot in a line with the callus is in addition. The suture is more widely black; and the wide fascia has a projection in front on each side of it.

This insect was captured in Peru, but whether at Chancamayo or not I am not certain.

27. ISCHYRUS GRAMMICUS.

Oblongus, subparallelus, nitidus, subtus rufo-piceus, supra rufo-testaceus, capite nigro; thoracis limbo tenuissimo maculis quatuor transversis, duabus basalibus triangularibus; elytrorum maculis duabus baseos, una subscutellari, altera subhumerali, plagis duabus rectis interstitialibus in medio maculisque tribus oblongis (duabus sublateralibus, una ante apicem), limbo toto tenuiter, sutura et maculis duabus suturalibus (una oblonga, altera pone medium rotundata) nigris; antennarum clava, tibiis geniculisque nigro-piceis.

Long. 9½ millim.

Hab. Peru, Chancamayo.

Punctuation fine but distinct under a strong glass, both on the head and thorax; the latter transverse with the sides rounded, and contracted near the front angles. Elytral striæ rather distinct; the black lines are between the first and the second, a short one close to the suture, often confluent, between the third and fourth and between the fifth and sixth of equal length, in the middle or nearly so and about equal to a third of the length of an elytron. The eighth stria is not visible; but following the seventh and hence in a line with the subhumeral spot, are two spots parallel to the median line.

28. LYBAS? DORSALIS.

Læte ferrugineus, prothoracis disco elytrorumque fascia lata communi marginem haud attingente nigris, antennis fuscis, basi rufis.

Long. 5½ millim.

Hab. Peru, Chamicuros (*Bartlett*).

Short, broad, and convex; thorax with a few scattered punctures on its disk; elytra rather deeply striated at their bases, but the striæ not continued to the middle. The black patch on the elytra leaves only a narrow band at the base, the entire margin as far as the last stria, and about two fifths at the apex, red.

The thorax has a distinct fovea on each side of the base, in which are a few larger punctures. The elytra are gibbous, depressed at the base, and with a deeply impressed marginal line.

I have seen one specimen in the collection of the late Mr. Crotch at Cambridge; and there is one in my own, given me by Mr. Bartlett.

29. PALÆOLYBAS CYCHRAMOIDES.

Ovatus, minus convexus, rufus; capite prothoraceque minute sed distincte punctatis, illo epistomate nigrescente; elytris minutissime punctatis, fere lævibus, callo humerali margineque (ad apicem latius) nigris.

Long. 8 millim.

Hab. Africa occid., Camaroon Mountains.

Broadly ovate; elytra without striæ, punctuation scarcely visible under a strong lens; tibiæ very broadly dilated; club of the antennæ dark. This is an insect allied to *P. humeralis*, Crotch; and I should hardly have ventured to assert its distinctness, the description of that species being so brief, but that fortunately the unique type from Murray's collection is now in my own.

It differs from *P. humeralis* in being less convex, in wanting any trace of striæ, and in the black margin which surrounds the elytra except at their bases, and which is very distinct. The rest of the insect, with the exception of the club of the antennæ and the epistoma in front, is deep brick-red. A single example.

EXPLANATION OF PLATE XVIII.

Fig. 1. *Triplatoma gestroi*, p. 80.
2. —— *andamanensis*, p. 79.
3. —— *philippinensis*, p. 79.
4. *Episcapha octopustulata*, p. 82.
5. *Micrencaustes torquatus*, p. 76.
6. *Hybosoma hydropicum*, p. 77.
7. *Encaustes crotchi*, p. 76.
8. *Megalodacne imperatrix*, p. 78.
9. *Megischyrus bartletti*, p. 85.
10. *Aulacochilus agaboides*, p. 83.
11. —— ——, var. *furciferus*, p. 84.
12. —— *episcaphoides*, p. 84.

2. On the Mollusca procured during the 'Lightning' and 'Porcupine' Expeditions, 1868–70. (Part VI.[1]) By J. Gwyn Jeffreys, LL.D., F.R.S., F.Z.S.

[Received February 23, 1883.]

(Plates XIX., XX.)

GASTROPODA (*continued*).

Family VI. Scissurellidæ.

1. Scissurella crispata, Fleming.

S. crispata, Flem. Mem. Wern. Soc. vi. p. 385, pl. 6. f. 3: B. C. iii. p. 283, pl. vii. f. 2; v. p. 201, pl. lx. f. 3, 3*a*, 3*b*.

'Lightning' Exp. St. 2, 5.

'Porcupine' Exp. 1869: 14, 25, 36 (var. *aspera*), 70. 1870: Atl. 1, 2, 6, 9, 13, 16–17*a*, 24, 27–30, Tangier B. (and vars. *angulata* and *aspera*); Med. 45, 50, Adventure Bank, off Rinaldo's Chair (var. *aspera*).

Distribution. From Spitzbergen to Sicily and Azores, and from Greenland to New England; 4–790 fms.

Fossil. Pliocene: Coralline Crag, Italy, Rhodes. Post-tertiary: Norway and Sicily.

S. angulata of Lovén and *S. aspera* of Philippi are varieties; the latter corresponds with my variety *paucicostata*. *S. angulata* is larger, and *S. aspera* more conical with stronger and fewer striæ. The height of the spire and consequent contraction of the umbilicus, as well as the number and strength of the riblets and spiral striæ, are variable characters. The variety *aspera* is more peculiarly Mediterranean than the typical form.

The animal was fully described by me in the 'Annals and Magazine of Natural History' for June 1870.

2. Scissurella umbilicata[2], Jeffreys. (Plate XIX. fig. 1.)

Shell forming a depressed sphere which is equally raised above and below, rather thin, semitransparent, and somewhat glossy: *sculpture*, none except very fine and close-set, but indistinct, lines of growth: *colour* white: *spire* slightly raised: *whorls* 4–5, flattened above and sloping outwards; they rapidly enlarge, so that the last or body-whorl considerably exceeds in size the rest of the shell: *slit* long and central, equal in width, with upturned edges: *mouth* nearly circular, but somewhat angulated where it is united to the body-whorl below the peripheral keel: *peristome* continuous, although not free in consequence of the inner lip being attached to the shell: *outer lip* thin and sharp: *inner lip* spread on the lower

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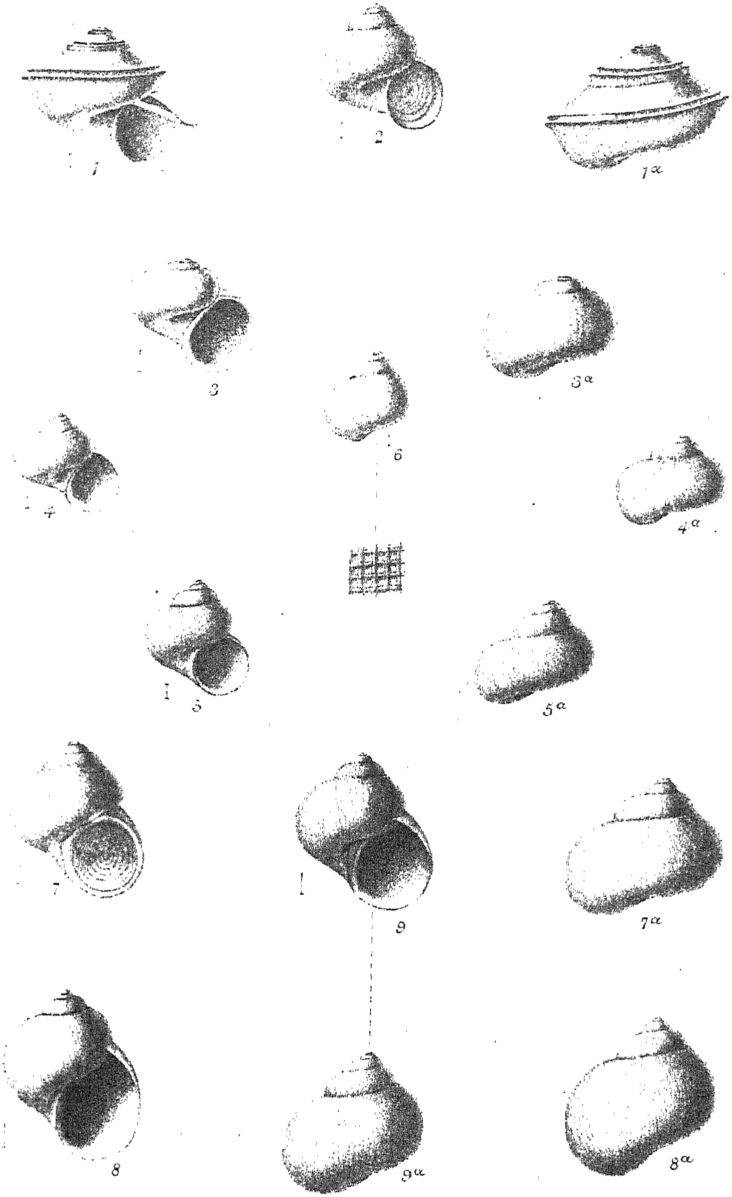
[1] For Part I. see P. Z. S. 1878, p. 393; for Part II. see P. Z. S. 1879, p. 553; for Part III. see P. Z. S. 1881, p. 693; for Part IV. see P. Z. S. 1881, p. 922; and for Part V. see P. Z. S. 1882, p. 656.

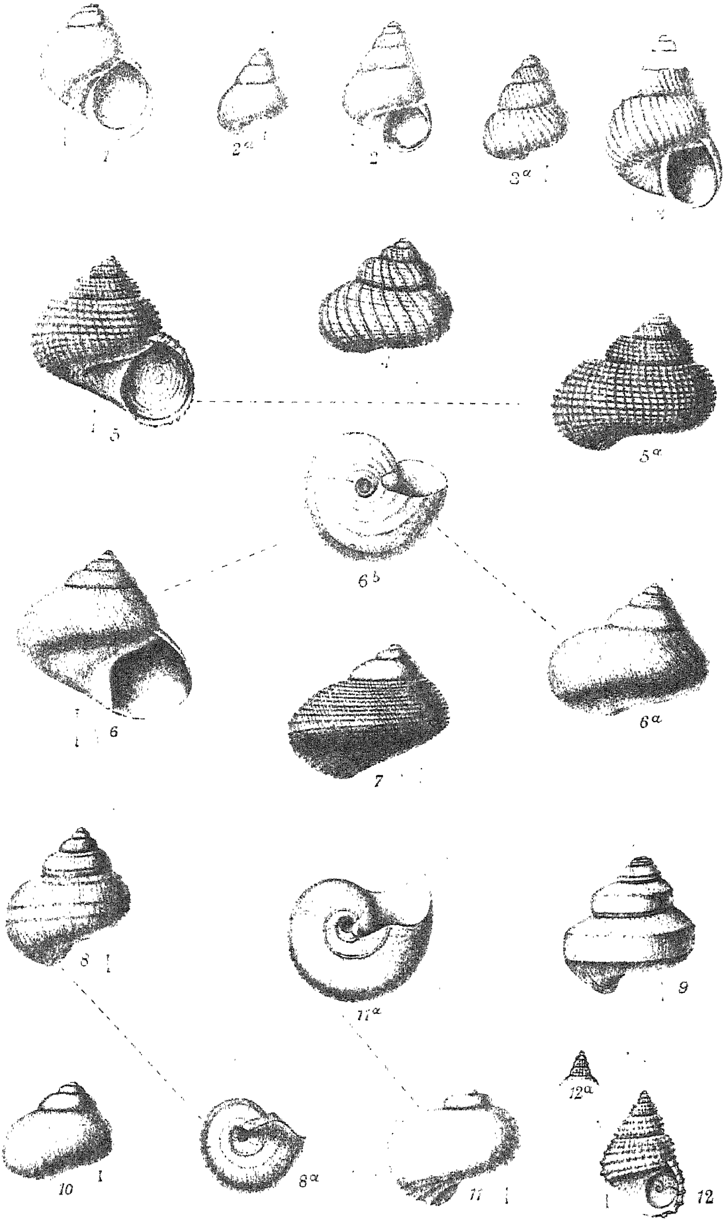
[2] Umbilicate.



C. Berjeau del. et lith.

MOLLUSCA OF THE "LIGHTENING" AND "PORCUPINE" EXPEDITIONS.

Hanhart imp.



C Berjeau del et lith

Hanhart imp

MOLLUSCA OF THE "LIGHTENING" AND "PORCUPINE" EXPEDITIONS.

part of the body-whorl: *umbilicus* rather large, funnel-shaped, and deep: *operculum* not observed, the specimens now described being dead. L. 0·1, B. 0·1.

'Porcupine' Exp. 1870: Atl. St. 16, 17, 17*a*. Several specimens, more or less perfect.

This differs from any other species known to me in being devoid of sculpture, and in having a conspicuous umbilicus.

3. SCISSURELLA COSTATA, d'Orbigny.

S. costata, d'Orb. Mém. Soc. d'hist. nat. de Paris, i. p. 344, t. xxiii. f. 2.

'Porcupine' Exp. 1870: Atl. St. Tangier B.

Distribution. Throughout the Mediterranean and Adriatic, Madeira (*Watson*), Teneriffe (*McAndrew*); 0–11 fms.

Fossil. Pliocene: Italy, Rhodes.

S. plicata and *S. striatula*, Philippi, besides several obsolete synonyms.

S. lævigata of d'Orbigny is apparently a variety.

Family VII. TROCHIDÆ.

1. MÖLLERIA COSTULATA, Möller.

Margarita? costulata, Möll. Ind. Moll. Grönl. p. 8.

Molleria costulata, B. C. iii. p. 291: G. O. Sars, Moll. reg. arct. norv. p. 127, t. 9. f. 8, *a–c*.

'Lightning' Exp., St. 2.

'Porcupine' Exp. 1870: Atl. 17.

Distribution. Arctic seas in both hemispheres, eastern coasts of N. America, Bay of Biscay ('Travailleur' Exp. 1880), St. Thomas, W. Indies (*Verkrüzen*); 0–150 fms.

Fossil. Post-tertiary: Scandinavia, Shetland, Scotland, co. Antrim, Canada; 0–460 ft.

This genus is distinguishable from *Cyclostrema* by having a double inside lip or a ledge to receive the strong calcareous operculum. The sculpture also is peculiar. I described the animal of *M. costulata* in the 'Annals and Magazine of Natural History' for March 1877. The odontophore has been figured by Friele.

Margarita minutissima of Mighels, and *Skenea molleri* of Philippi.

2. MÖLLERIA LEVIGATA, Jeffreys.

Molleria lævigata (Jeffr.), Friele, Bidrag til Vestlandets Molluskfauna (Vid. Forh. 1875), p. 4; separate copy.

Cyclostrema lævigatum, G. O. Sars, Moll. reg. arct. norv. p. 130, t. 21. f. 2, *a–b*.

'Lightning' Exp., St. 5, 6.

Distribution. Finmark (*G. O. Sars*), Bergen coast (*Friele, Norman*, and *J. G. J.*), Shetland (*J. G. J.*); 20–250 fms.

Fossil. Pliocene: Sicily.

Cyclostrema basistriatum of Brugnone; but in a copy of his paper, which he kindly sent me, he altered the specific name to *curvistriatum*.

I had overlooked a specimen of this little shell among my Shetland dredgings. The peristome and curved striæ on the base show that it belongs to *Mölleria* and not to *Cyclostrema*.

1. CYCLOSTREMA SERPULOÏDES, Montagu.

Helix serpuloides, Mont. Test. Brit. Suppl. p. 147, t. 21. f. 3.

C. serpuloïdes, B. C. iii. p. 290, pl. vii. f. 3; v. p. 201, pl. lxi. f. 3.

'Lightning' Exp., St. 4.

'Porcupine' Exp. 1880: Atl. Vigo B.

Distribution. Bodö in Norway to Sicily and the Adriatic; 0–80 fms.

Fossil. Pliocene: Calabria. Post-tertiary: Scandinavia and W. Scotland.

Skenea divisa of Fleming, and *Delphinula lævis* of Philippi.

2. CYCLOSTREMA AREOLATUM, G. O. Sars.

C. areolatum, G. O. Sars, Moll. reg. arct. norv. p. 345, t. 34. f. 6, *a–d*.

'Lightning' Exp. St. 2. Two specimens.

Distribution. Norway (*G. O. Sars*).

Some years before the publication by Prof. G. O. Sars I had sent a description of this species, under the name of *C. sculptum*, to the late Sir Wyville Thomson, at his request, for the purpose of having the Mollusca of the 'Lightning' Expedition separately published. That was not done; and I mention it, because my MS. must not now be regarded. This pretty little shell might be taken for the very young of *Trochus grœnlandicus*; but the peristome is complete.

3. CYCLOSTREMA RUGULOSUM, Jeffreys.

C. rugulosum (Jeffr.), G. O. Sars, Moll. reg. arct. norv. p. 129, t. 21. f. 1, *a–b*.

'Lightning' Exp. St. 5.

'Porcupine' Exp. 1870: Atl. 9.

Distribution. Lofoten I. and W. Norway, Messina (*Granata*), N. England (*Verrill*); 80–375 fms.

Fossil. Pliocene: Messina (*Seguenza*)!

More globular and smaller than *C. serpuloïdes*.

4. CYCLOSTREMA BASISTRIATUM, Jeffreys.

C. (*Molleria*) *basistriatum*, Brugn. Misc. Malach. pars ii. 1876, p. 17, f. 24.

C. basistriatum, Jeffr. Ann. & Mag. N. H. 1877, p. 234: G. O. Sars, Moll. reg. arct. norv. p. 128, t. 8. f. 8, *a–c*.

'Porcupine' Exp. 1869: St. 89. 1870: Atl. 16, 17, 17*a*.

Distribution. Spitzbergen to Dröbak, 'Valorous' Exp.; 50–1333 fms.

Fossil. Pliocene: Ficarazzi (*Brugnone*).

The shell is usually striated on the base only; but some specimens are striated on the upper whorls also, and others are occasionally striated throughout. For this reason I should have preferred another specific name; but Weinkauff, in his excellent and useful Catalogue of the Shells of the European Seas, as well as Friele, in his 'Oversigt over de i Bergen omegn forekomenender skaldægter Mollusker,' adopted my MS. name some years before Brugnone described another shell as fossil under the same name. See *Mölleria levigata* antè. The odontophore is figured by Friele.

C. profundum of Friele, from specimens striated throughout.

5. CYCLOSTREMA CUTLERIANUM, Clark.

Skenea cutleriana, Clark in Ann. & Mag. N. H. (n. ser.) iv. p. 424.

C. cutlerianum, B. C. iii. p. 287; v. p. 201, pl. lxi. f. 1.

'Porcupine' Exp. 1870: Atl. St. Vigo B.

Distribution. Skye, S. England, Guernsey, Naples and Sicily; 15–40 fms.

Fossil. Pliocene: Calabria and Sicily. Post-tertiary: Montreal (*Dawson*).

6. CYCLOSTREMA NITENS, Philippi.

Delphinula nitens, Phil. Moll. Sic. ii. p. 146, t. xxv. f. 4.

C. nitens, B. C. iii. p. 289; v. p. 201, pl. lxi. f. 2.

'Porcupine' Exp. 1870: Med. St. off Rinaldo's Chair.

Distribution. Shetland to the Ægean; 0–913 fms.

Fossil. Pliocene: Calabria and Sicily. Post-tertiary: Co. Antrim.

Margarita pusilla, Jeffreys, 1848; var. *Skenea? lævis*, Forbes and Hanley.

7. CYCLOSTREMA TROCHOÏDES, Jeffreys.

C. trochoides (Jeffr.), Friele, Bidr. Vestl. Molluskf. (Vid. Forh. 1875) p. 2, separate copy; G. O. Sars, Moll. reg. arct. norv. p. 131, t. 8. f. 9, *a–c*.

'Porcupine' Exp. 1870: Atl. St. 17*a* (living).

Distribution. Finmark and W. Norway, Bay of Biscay ('Travailleur' Exp. 1880), Palermo (*Monterosato*), N. England (*Verrill*); 10–372 fms.

The umbilicus is sometimes encircled by one or more strong spiral striæ.

Var. *C. peterseni*, Friele. He has figured the odontophore.

8. CYCLOSTREMA TENERUM[1], Jeffreys. (Plate XIX. fig. 2.)

SHELL globosely conical, thin and delicate, semitransparent, lustreless: *sculpture* extremely fine and close-set but nearly microscopic spiral striæ, which are wanting on the base and replaced by a rugose or fretted appearance: *colour* pale yellowish-white, with a faint tinge of green: *spire* considerably raised: *whorls* 4, rounded and convex; the last occupies two thirds of the spire; the first is very small and abruptly twisted: *suture* very deep: *mouth* circular, with a thin and slightly expanded lip: *umbilicus* rather narrow but deep: *operculum* thin, having 6 or 7 whorls, the two outermost being proportionally much larger than the inner whorls and divided by raised ledges. L. 0·075, B. 0·1.

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[1] Tender.

'Porcupine' Exp. 1869: St. 16. A single but living specimen.

The shell is more conical and thinner than *C. trochoïdes*; the spire is more raised, and the sculpture very different.

9. Cyclostrema valvatoides[1], Jeffreys. (Plate XIX. fig. 3.)

Shell obliquely helical, rather solid, opaque and glossy: *sculpture* none except slight and irregular lines of growth: *colour* whitish, with a faint tinge of yellow: *spire* depressed: *whorls* 4, rounded and swollen; the last expands outwards, and occupies about three fourths of the spire; the top whorls are flattened: *suture* deep: *mouth* very large and circular, with a short and obtuse angle at the upper corner; the lip is considerably reflected or folded back: *umbilicus* small and shallow. L. 0·075, B. 0·125.

'Porcupine' Exp. 1870: Atl. St. 17*a*. A single but perfect specimen.

The description shows that this is a very distinct and peculiar species. It certainly belongs to the present genus, although having the aspect of a *Valvata*.

10. Cyclostrema simile[2], Jeffreys. (Plate XIX. fig. 4.)

Shell orbicular, compressed above and below, rather thin, opaque, but glossy; *sculpture* none: *colour* whitish: *spire* much depressed: *whorls* 4½, rounded and convex; the last occupies about one half of the shell; first whorl spiral: *suture* wide and deep: *mouth* nearly circular, but slightly truncate on the inner side; edges thin: *umbilicus* open and deep, exposing part of the penultimate whorl. L. 0·025, B. 0·05.

'Porcupine' Exp. 1870: Atl. St. 16, 17*a*. Three specimens.

Smaller than *C. valvatoïdes*, but apparently full-grown; the spire is more depressed, the suture deeper, the last whorl not so disproportionately large, the mouth smaller with simple and not reflected edges, and the umbilicus is much more open.

11. Cyclostrema affine[3], Jeffreys. (Plate XIX. fig 5.)

Shell resembling a species of the *Margarita* section of *Trochus*, turreted, rather thin, semitransparent and glossy: *sculpture* none: *colour* clear white: *spire* raised: *whorls* 4, swollen; the last occupies about two thirds of the shell; first whorl bulbous: *suture* narrow but deep: *mouth* slightly angulated on the upper side, where it joins the periphery; edges thin: *umbilicus* contracted and small. L. 0·075, B. 0·075.

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[1] Shaped like a *Valvata*.

[2] Similar, *i. e.* to *C. valvatoïdes*.

[3] Allied, *i. e.* to species of *Trochus*.

'Porcupine' Exp. 1870: Atl. St. 16, 17, 17*a*, 27, 28. Specimens very numerous.

Distribution. Josephine Bank, Bay of Biscay ('Travailleur' Exp. 1881), Palermo (*Monterosato*); 103–913 fms.

Differs from *C. simile* in shape, as well as in the raised spire and narrow umbilicus.

12. CYCLOSTREMA BITHYNOÏDES[1], Jeffreys. (Plate XIX. fig. 6.)

SHELL oval, thin, having a somewhat frosty appearance, opaque and lustreless: *sculpture*, numerous, close-set, and delicate spiral striæ, which are only perceptible under a microscope: *colour* whitish: *spire* raised; *whorls* 3½; the last is tumid and takes up three fourths of the shell; apex slightly twisted: *suture* deep: *mouth* roundish-oval; the peristome is not disjoined from the pillar, although complete and partly attached to it: *umbilicus* very small. L. 0·065, B. 0·05.

'Porcupine' Exp. 1870: Atl. St. 16. A single specimen.

13. CYCLOSTREMA SPHEROÏDES, (*sphæroidea*) S. V. Wood.

Turbo spheroidea, S. V. Wood, Ann. & Mag. N. H. 1842, p. 533, pl. v. f. 3.

'Porcupine' Exp. 1870: Atl. St. 24, 26–28, 36, Tangier B. Several specimens.

Distribution. Bay of Biscay ('Travailleur' Exp. 1881).

Fossil. Pliocene: Coralline Crag, Sutton.

Although minute, this is a very remarkable and beautiful species. It appears to be more scarce as a fossil than as recent or living. The operculum has not yet been observed.

Genus THARSIS[2], Jeffreys.

SHELL globular, solid, and glossy: *peristome* circular and continuous, but attached to the pillar on that side: *base* closed by a pad or thick testaceous layer in the adult, perforated in the young: *operculum* chitinous or horny, and multispiral.

This genus differs from *Cyclostrema* in the peristome being, although continuous, not free or detached from the rest of the shell, and in the umbilicus being closed instead of open in the adult. I do not consider it (as Seguenza supposed) *Oxystele* of Philippi, which is typified by *Trochus merula*; in that genus the peristome is not continuous, and the pillar is sharply pointed or angulated at its base.

THARSIS ROMETTENSIS, Seguenza. (Plate XIX. fig. 7.)

Oxystele romettensis (Seg.), Granata-Grillo, Descr. de qu. esp. nouv. ou peu conn. 1877, p. 7.

'Porcupine' Exp. 1870: Atl. St. 16, 17, 17*a*, 24; Med. 45.

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[1] Shaped like a species of *Bithynia*.

[2] One of the many synonyms of Cyprus.

Distribution. Str. Messina (*Granata-Grillo*), Palermo (*Monterosato*), Tunisian coast ('Shearwater' Exp.), Bay of Biscay ('Travailleur' Exp. 1880), G. Marseilles ('Travailleur' Exp. 1881); 108–1093 fms.

Fossil. Pliocene: Calabria and Sicily (*Seguenza*).

Genus GANE'SA[1], Jeffreys.

SHELL shaped like a *Natica*, thin: *peristome* continuous, free and separate in the young, but united to the periphery in the adult: *spire* having an oblique axis: base perforated, not umbilicate: *operculum* horny, multispiral.

Differs from *Tharsis* in the obliquity of the spire and perforation of the base at every stage of growth.

1. GANESA PRUINOSA[2], Jeffreys. (Plate XIX. fig. 8.)

SHELL nearly spherical, of a delicate texture, semitransparent, lustreless and having a remarkably frosted appearance: *sculpture* very peculiar, and consisting of minute and numerous, but irregularly disposed, white tubercles, which are partly embedded in the substance of the shell; one specimen is marked by slight spiral lines below the suture of each whorl: *colour* dull white: *spire* raised: *whorls* 4, swollen; the last exceeds in size three fourths of the whole shell; apex prominent and twisted: *suture* deep: *mouth* nearly circular, angulated at the upper corner: *base* oblique, having a small and narrow umbilical chink: *operculum* glossy, having the edges of the whorls raised. L. 0·175, B. 0·15.

'Porcupine' Exp. 1869: St. 23. 1870: Atl. 17, 17*a*. A few specimens.

2. GANESA NITIDIUSCULA[3], Jeffreys. (Plate XIX. fig. 9.)

SHELL differs from *G. pruinosa* in being exactly globular, opaque, and rather glossy; the sculpture consists of flexuous but slight and remote raised striæ in the line of growth; the last or body-whorl is not so disproportionately large; the apex of the spire is depressed; the mouth is angulated both above and below; and the umbilical chink is channelled. L. 0·125, B. 0·125.

'Porcupine' Exp. 1869: St. 23*a*. 1870: Atl. 17.

Distribution. Between the Hebrides and Faroes ('Triton' cruise); 570 fms. Very rare.

Genus CIRCULUS[4], Jeffreys.

ANIMAL not known.

SHELL coin-shaped or forming a circular compressed disk, slightly nacreous or pearly: *mouth* quadrangular, with a discontinuous peristome: *umbilicus* very wide: *operculum* multispiral, as in other genera of *Trochidæ*.

Originally proposed by me as a section of *Trochus*, but since adopted by Monterosato as a generic name.

[1] The Hindoo god of science.

[2] Frosted.

[3] Somewhat shining.

[4] A little circle.

CIRCULUS STRIATUS, Philippi.

Valvata striata, Phil. En. Moll. Sic. i. (1836) p. 147, t. ix. f. 3, *a–c*.

Trochus duminyi, B. C. iii. p. 315; v. p. 203, pl. lxii. f. 5.

'Porcupine' Exp. 1869: Donegal B.

Distribution. Bundoran in Donegal Bay, Atlantic coasts of France and Spain, Mediterranean, and Atlantic; 20–50 fms.

Fossil. Pliocene: Coralline Crag and Italy.

Solarium philippii, Cantraine, and *Delphinula duminyi*, Requien.

A. MARGARITA, Gray.

1. TROCHUS FULGIDUS[1], Jeffreys. (Plate XX. fig. 1.)

SHELL globoso-conical, rather thin, transparent, and of a bright lustre: *sculpture*, only some very fine and scratch-like spiral striæ round the base: *colour* clear white: *spire* raised: *whorls* 4, convex, somewhat flattened below the suture; the last occupies four fifths of the shell; apex depressed, and regularly spiral: *suture* rather deep: *mouth* circular, incurved above; the peristome is not continuous or complete, but similar to that of other species in the present genus; *umbilicus* narrow and deep; *operculum* filmy, multispiral, with obscure lines to distinguish the whorls. L. 0·1, B. 0·085.

'Porcupine' Exp. 1870: Atl. St. 9. A single but living specimen.

2. TROCHUS MINUTULUS[2], Jeffreys. (Plate XX. fig. 2.)

SHELL pyramidal, rather solid for its minute size, opaque, and polished: *sculpture* none: *colour* white, with a yellowish tinge: *spire* raised: *whorls* 6, moderately convex but compressed, regularly enlarging; the last is slightly keeled on the periphery, and occupies about two fifths of the shell; apex blunt: *suture* distinct and rather deep: *mouth* representing an arc of two thirds of a circle, incurved just below the periphery, and somewhat expanded below: *umbilicus* sunken, with a small and deep perforation in the middle. L. 0·0625, B. 0·05.

'Porcupine' Exp. 1880: Atl. St. 16, 17*a*. A few specimens.

Fossil. Pliocene: Messina (*Seguenza*, as *Margarita minima*, MS.)! As this name, however, has not been published, nor (as I believe) been known to any but Seguenza and myself, I venture to change it for an equally classical name which has not the objection of being comparative in point of size. Perhaps hereafter a still more minute species may be discovered, and thus the name *minima* would become inappropriate.

3. TROCHUS LAMINARUM[3], Jeffreys. (Plate XX. fig. 3.)

SHELL conical, rather thin, semitransparent, and lustreless: *sculpture*, numerous thin and delicate, but jagged and irregular curved laminæ in the line of growth, which do not extend to the umbilicus;

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[1] Glittering.

[2] Very small.

[3] Covered with thin plates.

there are about 40 on the last whorl, some of them double; the interstices are quite smooth: *colour* light yellowish-brown: *spire* raised: *whorls* 6, convex and rounded; the last is equal to about two fifths of the spire; apex twisted: *suture* distinct: *mouth* nearly circular; outer lip thin, but thicker and expanded at the base and partly folded over the umbilical perforation: *umbilicus* somewhat concave, with a small perforation. L. 0·15, B. 0·1.

'Porcupine' Exp. 1870: Atl. St. 16, 17*a*. Two specimens, one imperfect and the other not full-grown.

4. TROCHUS CANCELLATUS[1], Jeffreys. (Plate XX. fig. 4.)

SHELL forming a depressed cone, rather thin, opaque, and lustreless: *sculpture*, oblique laminar ribs in the line of growth, which are crossed by as many but slighter spiral striæ; there are about 20 ribs and striæ on the last whorl; this sculpture covers the base, but the striæ are wanting on the apex: *colour* pale yellowish-brown: *spire* rather depressed: *whorls* 5–6, convex; the last occupies three fifths of the shell; apex regular and compressed: *mouth* more round than oval, angulated above and below on the inner side: *outer lip* somewhat expanded and thickened: *inner lip* nearly straight, attached to the pillar below the periphery: *umbilicus* rather narrow, with a deep perforation which exposes the inner whorls. L. 0·1, B. 0·15.

'Porcupine' Exp. 1870: Atl. St. 16. A single specimen.

Distribution. Josephine Bank ('Josephine' Exp.); 340–430 fms.

This and the following five species, or some of them, belong to the genus *Machæroplax* of Friele, which chiefly depends on the form of the radula or odontophore.

5. TROCHUS CINEREUS, Couthouy.

Turbo cinereus, Couth. in Boston Journ. Nat. Hist. vol. ii. p. 99, pl. 3. f. 9 (1839).

Trochus cinereus, B. C. iii. p. 304; v. p. 202.

'Porcupine' Exp. 1869: St. 14. A young and dead specimen, but apparently recent.

Distribution. Arctic seas in both hemispheres, from Spitzbergen and Iceland to Floroe near Bergen and the Siberian coast, and from W. and E. Greenland to C. Cod, and Behring Str. to Sitka; 5–150 fms.

Fossil. Post-tertiary: Scandinavia, Shetland, E. and W. Scotland, Ireland, N. America, and Sicily?; 0–460 ft.

Margarita striata of Broderip and Sowerby (1828–29), but not *Trochus striatus* of Linné, possibly *M. arctica* of Leach (1819) and *T. leachii* of Philippi, and *M. sordida* of Hancock. As fossil, perhaps *T. granatelli* of Calcara. Leach's description is indeterminable, viz.:—"*M.* purpurascente carnea tenuiter striolata, operculo testaceo."

The animal has been described by me (in the 'Annals and Magazine of Nat. Hist.' for March 1877), and the odontophore by Friele.

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[1] Cross-barred.

6. **TROCHUS OBSCURUS**, Couthouy.

Turbo obscurus, Couth. in Bost. Journ. N. H. ii. p. 100, pl. 3. f. 12.

'Lightning' Exp. St. 2. Fragment.

'Porcupine' Exp. 1869: St. 51. Three living specimens.

Distribution. Spitzbergen, Novaia Zemblia, and Jan Mayen I. to Upper Norway, Aleutian I. and Sitka, G. St. Lawrence, Nova Scotia, and N. England; 0–430 fms.

Fossil. Post-tertiary: Novaia Zemblia (*Leche*).

I consider *Margarita albula* of Gould and *M. bella* of Verkrüzen varieties of the present species.

7. **TROCHUS GRŒNLANDICUS**, Chemnitz.

T. grœnlandicus, Chemn. Conch. Cab. v. p. 108, t. 171. f. 1671: B. C. iii. p. 298; v. p. 202, pl. lxi. f. 5.

'Lightning' Exp. St. 7. Fragments.

'Porcupine' Exp.: N. Channel.

Distribution. Spitzbergen, Jan Mayen I., Novaia Zemblia, Siberian coast, Iceland, Faroes, Norway, Shetland and Orkneys, Scotland, E. and W. Greenland, and Canada southwards to C. Cod; 0–150 fms.

Fossil. Post-tertiary: Scandinavia, E. and W. Scotland, Ireland; 0–460 ft.

Trochus cinerarius of Fabricius but not of Linné, *Tr. Fabricii* of Philippi, *Turbo incarnatus* of Couthouy, *Turbo carneus* of R. T. Lowe, *Margarita undulata* of G. B. Sowerby, and *Tr. inflatus* of Brown. Possibly *Turbo fuscus* of O. F. Müller and *Margarita striata* of Leach. The sculpture in this, as well as in the last species, is very variable.

8. **TROCHUS CINCTUS**, Philippi.

T. cinctus, Ph. En. Moll. Sic. (1836) i. p. 185, t. x. f. 20, 20*a*.

T. amabilis, B. C. iii. p. 300; v. pl. lxi. f. 6.

'Lightning' Exp. St. 2.

'Porcupine' Exp. 1869: 3, 14, 15, 23*a*, 36, 51, 61, 89. 1870: Atl. 1, 2, 3, 3*a*, 9, 13, 14, 24, 25, off C. Sagres, 26–30. And variety *affinis*.

Distribution. Shetland, W. Norway, var. *affinis* (*Friele* and *G. O. Sars*), Bay of Biscay ('Travailleur' Exp. 1881–82), Azores ('Josephine' Exp.); 85–673 fms.

Fossil. Pliocene: Coralline Crag, Monte Mario, Calabria, and Sicily.

Solariella (afterwards *Margarita*?) *maculata* of S. V. Wood, and *Solarium calandrelli* of Conti. I do not consider *Turbo moniliferus* of Nyst (not of J. Sowerby), afterwards his *Solarium turbinoides*, from the "sables noirs" of Antwerp, the same as the present species. The shape and sculpture are very different As recent it is my *Trochus amabilis*; the variety *affinis* is *Machæroplax hidalgoi* of Fischer. *T. affinis* of D'Eichwald is a very different species.

This lovely shell is extremely variable in respect of the height of the spire and the consequent contraction or dilatation of the umbilicus, as well as with regard to the sculpture. I have now examined between 200 and 300 specimens of different sizes and ages, and can scarcely find any two of them exactly alike. A remarkable variety which I have named *affinis*, and at one time believed to be a distinct species, is figured in Plate XX. fig. 5. It is finely and closely reticulated; the whorls are rounded and show no trace of angularity; and the umbilicus is not encircled by a keel. The typical or fossil form is usually marked with an irregular row of reddish spots, which are not observable in living specimens. Owing to the variability and the want of sufficient means of comparison, I could not identify our Crag shell with the recent species; but the opportunity lately afforded me by my friend Prof. Seguenza of inspecting his extensive and most interesting collection of Reggio fossils has now enabled me to connect them.

9. TROCHUS OTTOI, Philippi.

T. ottoi, Phil. Moll. Sic. ii. p. 227, t. xxviii. f. 9.

'Porcupine' Exp. 1869: St. 23; fragments. 1870: Atl. 16, 17, 17*a*, off C. Espichel.

Distribution. Josephine Bank, Bay of Biscay ('Travailleur' Exp.), between the Hebrides and Faroes ('Triton' cruise), Mediterranean, ('Washington' Exp. 1881), St. Thomas, Danish W. Indies ('Challenger' Exp.), N. England; 115–1044 fms.

Fossil. Pliocene: Calabria and Sicily.

Margarita regalis of Verrill and Smith, *Trochus* (*Margarita*) *rhysus* and *T.* (*Marg.*) *ægleis* of Watson, and *T. vaillanti* of Fischer.

The American resemble the fossil specimens more closely than those from the European seas; but the species shows considerable variability as regards the sculpture and umbilicus. The apex or primary whorls ought to be examined in this and all other turbinated Gasteropods as affording a good criterion of distinction.

So many species of this peculiar and beautiful type have been described by Mr. Watson from the 'Challenger' Expedition, that they might constitute a distinct section of *Trochus* equal to that of *Margarita*.

B. OXYSTELE, Philippi.

10. TROCHUS EUSPIRA, Dall. (Plate XX. fig. 6.)

Margarita? euspira, Dall, Bull. Mus. Comp. Zoöl. 1881, p. 44.

'Porcupine' Exp. 1870: Atl. St. 16, 17, 17*a*. Specimens numerous, but dead and few quite perfect.

Distribution. Culebra I., Danish W. Indies ('Challenger' Exp.), G. Mexico ('Blake' Exp.); 390–805 fms.

The diameter of my largest specimen is about three tenths of an inch or 9 millimètres. This pretty shell is extremely variable as regards the height of the spire and the sculpture. Some specimens are quite smooth; others are spirally striated throughout, or on the body-whorl only, or on the upper whorls, or round the umbilicus; some (var. *coronata*) have a row of beads below the suture. In all my specimens there is a minute tubercle on the broad and fretted pillar *near* its base, but not *at* its base as stated by Mr. Dall in the description of his specimens. The young are always umbilicate.

Philippi's description of his genus *Oxystele* in the 'Handbuch der Conchyliologie und Malacozoologie,' 1853, p. 210, is as follows:—

"*Oxystele*, Ph. 1847, Zeitschr. f. Malak. p. 19[1]. Das Gehäuse ist conoidisch, glatt, ungenabelt, anstatt des Nabels eine dünne porzellanartige Ausbreitung der Spindel; diese ist platt, schneidend, geht allmählig in die dünne äussere Lippe über. *Tr. merula*." These characters exactly suit the present species. Mr. Dall proposed a new sectional name *Bathymophila*.

The manuscript name which I had given to the present species was *nitens*; but that name had been already used for an Australian species.

11. TROCHUS SUTURALIS, Philippi.

T. suturalis, Phil. En. Moll. Sic. i. p. 185, t. x. f. 23, 23*a*; ii. p. 156.

'Porcupine' Exp. 1869: St. 36. 1870: Atl. 3, 3*a*, 6, 8, 9, Vigo B., 13, 24–28*a*, 36; Med. 45, Rasel Amoush, G. Tunis.

Distribution. Bay of Biscay and G. Marseilles ('Travailleur' Exp.); 174–1025 fms.

Fossil. Pliocene: Monte Mario, Calabria, and Sicily.

Animal pale brownish-yellow: *tentacles* conical, edged on each side with a purplish-brown line: *eyes* black, conspicuous, placed as usual in the genus: *foot* thick, fringed with white conical papillæ, 4 on each side; no ocelli or eye-spots.

The small fossil originally described and figured by Philippi did scant justice to this beautiful shell, which has now been discovered to be still living. My finest specimens are about seven tenths of an inch in length and breadth; the colour is cream with the tint of a blush rose; and the sculpture is variable as regards the beaded rows of striæ. Young specimens have a deep umbilicus which is enclosed within a sharp ridge. The callus which covers the umbilicus in the adult is proportionally thinner than in the last species.

T. folini of Fischer is a variety of this species.

C. TROCHOCOCHLEA, Klein.

12. TROCHUS LINEATUS, Da Costa.

Turbo lineatus, Da Costa, Brit. Conch. p. 100, t. vi. f. 7.
Trochus lineatus, B. C. iii. p. 317; v. p. 203, pl. lxii. f. 9.

'Porcupine' Exp. 1869: St. Donegal B. 1870: Atl. Vigo B.

Distribution. N. Ireland and Anglesea to Mogador, the Ægean, Adriatic, Canaries (*d'Orbigny*)?; 0–20 fms. My friend Mr. Watson kindly sent me from Madeira specimens of an allied species, having a broad and flattened base, which he considered the present species.

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[1] "ὀξύς scharf, στήλη Säule."

Fossil. Pliocene: Leghorn (*Appelius*). Post-tertiary: Cumbrae (*Robertson*), Selsea (*A. Bell*).

Trochus crassus of Pulteney, whose *T. lineatus* is the young; a variety is *Monodonta articulata*, Lamarck, *M. draparnaudi*, Payraudeau, *M. punctulata*, de Blainville (not of Lamarck), *M. sitis*, Récluz (young), and *Turbo corcyrensis*, Stossich (young). Not *Trochus lineatus* of Lamarck, which is a Senegalese species.

The young are umbilicate, as in the last and other species of this genus.

13. TROCHUS TURBINATUS, Born.

T. turbinatus, Born. Mus. Cæs. Vind. Test. 1778, p. 340; id. 1780, t. 12. f. 5, 6.

'Porcupine' Exp. 1870: Med. St. Algesiras B.

Distribution. Charente-Inférieure (*Beltrémieux*), throughout the Mediterranean and Adriatic, Canaries (*Lister* and *d'Orbigny*); 0–2 fms.

Fossil. Pliocene: Italy. Post-tertiary: S. France.

This species, which is so peculiar to the Mediterranean and Adriatic, is also *T. tessulatus* of Born, *T. tessellatus* of Gmelin, *Monodonta fragaroides* of Lamarck, *M. olivieri* of Payraudeau, and *T. fragarioides* of Philippi, a variety being his *T. mutabilis*.

Perhaps *T. lineatus* may be the same species. The publications of Da Costa and Born were contemporaneous. Both species, if distinct, are variable; and there appear to be intermediate gradations.

D. GIBBULA, Risso.

14. TROCHUS MAGUS, Linné.

T. magus, L. S. N. p. 1228: B. C. iii. p. 305; v. p. 203, pl. lxii. f 1.

'Porcupine' Exp. 1870: Med. Capo di Gaeta, Benzert Road, Adventure Bank.

Distribution. S.W. Sweden and Shetland to Mogador, Mediterranean, Adriatic, Canaries; 0–40 fms.

Fossil. Pliocene: Italy, Rhodes, Cos, C. Verde I. Post-tertiary: Norway, British Isles, and Tuscany; 0–1360 ft.

15. TROCHUS RICHARDI, (*richardii*) Payraudeau.

T. richardii, Payr. Moll. Corse (1826), p. 138, t. vii. f. 1, 2.

'Porcupine' Exp. 1870: Atl. St. Gibraltar B.

Distribution. Coast of Portugal and Gibraltar (*McAndrew*), Mediterranean and Adriatic, Canaries (*d'Orbigny*); 0–13½ fms.

Fossil. Pliocene: Italy. Post-tertiary: S. France and Leghorn.

Turbo variegatus (1813) and *Phorcus margaritaceus* (1826), Risso; *Trochus cinerarius*, Costa, not Linné.

16. **Trochus delicatus**[1], Jeffreys. (Plate XX. fig. 7.)

Shell forming a depressed cone, thin, opaque, rather glossy: *sculpture,* on the body or last whorl only, fine and close-set spiral striæ, crossed by equally numerous curved longitudinal striæ; the spiral striæ are wanting below the suture, and are few and slight on the base; periphery bluntly keeled; umbilicus partly enclosed by a small ridge, which extends through the middle of the inside and becomes thicker outside; all the upper whorls are quite smooth: *colour* milk-white: *whorls* 4½, moderately convex, the last occupying about three fourths of the shell; apex somewhat twisted: *mouth* roundish: *outer lip* thin: *inner lip* filmy: *inside* slightly nacreous: *umbilicus* small but deep. L. 0·075, B. 0·125.

'Porcupine' Exp. 1870: Atl. St. 24. A single and imperfect but characteristic specimen.

17. **Trochus varius**, Linné.

T. varius, L. S. N. p. 1229; Philippi, Moll. Sic. i. t. x. f. 19.

'Porcupine' Exp. 1870: Atl. St. Vigo B.

Distribution. Gulf of Gascony (*de Folin*), Mediterranean and Adriatic; 0–2 fms.

Fossil. Pliocene: Italy.

T. roissyi, Payraudeau, and *T. varians,* Deshayes. Var. *Gibbula elata,* Brusina.

18. **Trochus cinerarius**, Linné.

T. cinerarius, L. S. N. p. 1229: B. C. iii. p. 309; v. p. 203, pl. lxii. f. 3.

'Porcupine' Exp. 1869: St. L. Foyle, near Belfast. 1870: Atl. Vigo B., 26.

Distribution. Iceland, Finmark, and Faroe I. to the Lusitanian coasts, Mogador, Mediterranean, Adriatic, and Black Sea; 0–60 fms., inhabiting the littoral and laminarian zones.

Fossil. Pliocene: Red Crag. Post-tertiary: Scandinavia and British Isles; 0–600 ft.

Variable in size and the comparative height of the spire.

Synonyms rather numerous. Among these or as representing varieties are *Trochus lineatus* of Da Costa, *T. philippii* of Aradas, and *T. cineroides* of Searles Wood. Not *T. cinerarius* of Born, Brocchi, Olivi, O. G. Costa, or Bellardi. My variety *variegata* is not *Monodonta ægyptiaca* of Payraudeau, which is *Trochus fanulum* of Gmelin.

19. **Trochus villicus**, Philippi.

T. villicus, Phil. Moll. Sic. ii. p. 152, t. xxv. f. 14.

'Porcupine' Exp. 1870: Atl. St. Vigo B.; Med. 50.

Distribution. Mediterranean, Black Sea, and Adriatic; 0–20 fms.

Closely allied to *T. cinerarius,* and perhaps a variety of it. It may have been included in Linné's too short description of that species.

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[1] Delicate.

T. leucophæus of Philippi appears to be a variety. It is strangely omitted in his terrible list of between 400 and 500 so-called species of *Trochus* given in Küster's edition of the 'Conchylien-Cabinet' subsequently to the publication of Philippi's work on the Mollusca of the two Sicilies.

20. Trochus adansoni, (*adansonii*) Payraudeau.

T. adansonii, Payr. Moll. Corse, p. 127, t. vi. f. 7, 8.

'Porcupine' Exp. 1870: Med. St. Algesiras B. A small and non-umbilicate variety.

Distribution. Throughout the Mediterranean, Adriatic, and Black Sea; 1–277½ fms.

Fossil. Pliocene: Coralline Crag, Italy, Archipelago, and S. Russia.

I am inclined to unite with this common species, as synonyms or varieties, *T. turbinoides* of Deshayes, *T. saulcyi* of d'Orbigny, *T. adriaticus* and *T. biasoletti* of Philippi, *T. olivaceus* and *T. cinerascens* of Anton, *T. colybii* of Mittré, *T. pallidus, lyciacus,* and *spratti* of Forbes, *T. albidus* of Weinkauff as of Gmelin, *T. drepanensis* of Brugnone (young), and other species. Brusina refers it to *T. angulatus* of D'Eichwald (Zool. spec. Rossiæ et Poloniæ, 1829); but that is a very questionable identification, and the specific name had been previously used by Quoy and Gaimard for another species of *Trochus*.

21. Trochus tumidus, Montagu.

T. tumidus, Mont. Test. Brit. p. 280, t. 10. f. 4: B. C. iii. p. 307; v. p. 203, pl. lxii. f. 2.

'Lightning' Exp. St. 7.

'Porcupine' Exp. 1869: St. L. Foyle. 1879: Atl. 12, Gibraltar B.

Distribution. Iceland, Faroes, and Finmark to Egypt and the Adriatic; 0–145 fms.

Fossil. Pliocene: Red Crag. Post-tertiary: Scandinavia, Scotland, Ireland, and Selsea; 0–460 ft.

Var. *minor*. *T. racketti*, Payraudeau, and *T. gibbosulus*, Danilo and Sandri. This is the usual form in the Mediterranean, although I have the typical form from Corsica. I now believe that it cannot be (as Dillwyn supposed) *T. nassariensis* of Chemnitz or *T. patholatus* of Gmelin, which was said to have derived the first specific name from the Nassau Islands in the Indian Ocean. The fry was figured by Walker as *T. fuscus*, and described by Macgillivray as *Skenea serpuloides*.

22. Trochus umbilicatus, Montagu.

T. umbilicatus, Mont. Test. Brit. p. 286: B. C. iii. p. 312; v. p. 203, pl. lxii. f. 4, 4*a*.

'Porcupine' Exp. 1869: St. Donegal B. 1870: Atl. Vigo B.

Distribution. Stornoway to Gibraltar, Mogador, G. Lyons, Algiers, G. Naples, and other parts of the Mediterranean as well as the Adriatic; 0–20 fms., living in the littoral and laminarian zones.

Fossil. Pliocene: Tuscany. Post-tertiary; Cumbrae, Ireland, Cheshire, Shropshire, Hants, and Dorset.

T. umbilicaris, Pennant (not Linné), *T. umbilicalis*, Da Costa, and other synonyms. *T. oblique radiatus* of Chemnitz or *T. obliquatus* of Gmelin is most probably *T. divaricatus* of Linné, if indeed the last-named species be distinct from the present. Should they prove to be identical, my view that the Mediterranean has no peculiar Molluscan fauna would be further confirmed. See the Report of the British Association for 1873. *T. divaricatus* of Gmelin is evidently *Lacuna divaricata*, although he gives the habitat in his usual muddled way, viz. " mari mediterraneo et groenlandico." The umbilicus is either open or closed, as in *T. divaricatus*. I subjoin a description of the animal of var. *agathensis* (*T. agathensis*, Récluz), which has no umbilical perforation.

BODY greyish-white or soot-coloured, closely streaked lengthwise with purplish-brown, sometimes having a yellow tinge: *mantle* thick, with large lobes or lappets, sulphur-coloured; the lobe on the right hand is scalloped, the other having plain edges and folded: *snout* thick and rather short: *tentacles* filiform, club-shaped at the tips, thickly covered with short cilia, and ringed with purplish-brown: *eyes* globular, placed on angular offsets at the outer bases of the tentacles: *foot* oblong, rounded or bluntly pointed at each end; sides closely tessellated or reticulated by purplish-brown lines, with occasionally a few white specks; edges fringed with numerous clavate points arranged in a single row; sole pale lemon-coloured: *appendages* three on each side, resembling the tentacles in shape, but somewhat shorter. Inhabits the lower part of the tide-mark throughout the Channel Isles, the ordinary or typical form occupying the higher part, and both forms (as well as an intermediate one) being found halfway. It crawls like *Littorina*, by an alternate wave-like motion of each side of the foot.

23. TROCHUS DIVARICATUS, Linné.

T. divaricatus, L. S. N. p. 229; Philippi, Conch. Cab. ed. Küster, t. 29. f. 16.

'Porcupine' Exp. 1870: Atl. St. Gibraltar B.

Distribution. Atlantic coasts of France (*Petit*)?, N. Spain and Portugal (*McAndrew*), Mediterranean, Adriatic, and Black Sea; 0–15 fms.

Fossil. Post-tertiary: S. France (*Fischer*).

The umbilicus is perforated in the young and closed in the adult.

T. rarilineatus of Michaud is a variety of this species according to Monterosato.

24. TROCHUS TRICARINIFER, (*tricariniferus*) Searles Wood.

T. tricariniferus, S. Wood, Crag Moll. 1848, p. 132, t. xiv. f. 6, *a–b*.

'Porcupine' Exp. 1870: Atl. St. 16. A single specimen

Distribution. Josephine Bank ('Josephine' Exp.); 340–430 fms.
Fossil. Pliocene: Coralline Crag, Sutton.

25. TROCHUS DITROPIS, Searles Wood.

T. ditropis, S. Wood, Crag Moll. p. 133, t. xiv. f. 9, *a–b*.

'Porcupine' Exp. 1870: Med. St. Algesiras B., 50. A single specimen from each station. Umbilicus small.

Distribution. Palermo (*Monterosato*); about 22 fms.

Fossil. Pliocene: Coralline Crag, Sutton.

The specimen from Algesiras Bay is sculptured spirally and coarsely, like the Crag specimens; that from Station 50 is very finely and closely striated lengthwise on the upper part of the body-whorl, besides having the same spiral striæ on the rest of the shell. Both these specimens have purplish-brown blotches. Umbilicus very small.

Not the very young of *T. guttadauri*, as might be hastily supposed. I am not disposed to refer the present species to *T. biangulatus* of D'Eichwald ('Lethæa Rossica,' iii., dernière période, p. 226, esp. 199, pl. ix. f. 15, *a, b*; 1853), which is very much larger than *T. ditropis*, and is described as very finely striated in an oblique direction as well as spirally or transversely, and as having a larger umbilicus.

E. ZIZIPHINUS, Leach.

26. TROCHUS MONTACUTI, (*montagui*) W. Wood.

T. montagui, W. Wood, Ind. Test. Suppl. pl. 6. f. 43.
T. montacuti, B. C. iii. p. 320; v. p. 203, pl. lxiii. f. 1.

'Lightning' Exp. St. 5.

'Porcupine' Exp. 1869: St. 6. 1870: Atl. Vigo B.

Distribution. British and Belgian coasts to Malta, var. *nana*, coast of Tunis ('Shearwater' Exp.), Canaries (*McAndrew*); 7–95 fms.

Fossil. Pliocene: Coralline and Red Crag, Antwerp Crag?, S. France, Italy?, and Rhodes?

T. cyrnæus, Requien, *T. tumidulus*, Aradas, and *T. parvulus*, Philippi. *T. turgidulus* of Brocchi is more conical, the whorls are less convex, and the sculpture is finer; but the present species may be its slightly altered descendant. The umbilicus has occasionally a small perforation.

27. TROCHUS STRIATUS, Linné.

T. striatus, L. S. N. p. 1230: B. C. iii. p. 322; v. p. 203, pl. lxiii. f. 2.

'Porcupine' Exp. 1870: Atl. St. Vigo B.; Med. Algesiras B., Adventure Bank.

Distribution. S. England, Ireland, coasts of France, Spain, Portugal, Italy, Ægean and Archipelago, Adriatic, N. Africa, Madeira, and Canaries; 0–108 fms.

Fossil. Pliocene: Antibes, Italy, and Rhodes. Post-tertiary: S. France.

T. striatus and its varieties have many synonyms, including (from my examination of the types) *T. gravesi* of Forbes, *T. ruscurianus* of Weinkauff, *T. littoralis* of Brusina, and *T. fraterculus* of Monterosato. This common species is extremely variable as regards the height of the spire, colour, sculpture, and the comparative prominence of the basal keel. The small striæ which intersect the spiral ribs are either fine and close-set, or coarse and comparatively few in number, and sometimes are altogether wanting. *T. unidentatus* of Philippi may be another variety of the present species.

28. TROCHUS EXASPERATUS, Pennant.

T. exasperatus, Penn. Brit. Zool. iv. p. 126: B. C. iii. p. 324; v. p. 203, pl. lxiii. f. 3.

'Porcupine' Exp. 1870: Atl. St. Vigo B., Tangier B.; Med. Algesiras B., G. Tunis.

Distribution. S. England, Ireland?, Scotland?, Atlantic coasts of France, Spain and Portugal, Mediterranean, Black Sea, Adriatic, Morocco, Canaries, Madeira, and Azores; 0–105 fms.

Fossil. Pliocene: Italy, Archipelago, and Rhodes. Post-tertiary: Wexford?, Selsea, Antibes.

The opinion which I ventured to express in my work on British Conchology (iii. pp. 323, 325) that this species is the same as *T. striatus*, or a variety of it, has been strengthened by further observation and experience. Among the synonyms of the present species are *T. erythroleucus*, *T. strigosus*, and *T. punctulatus* of Gmelin, *T. exiguus* of Pulteney, *T. crenulatus* of Brocchi, *T. pyramidatus* of Lamarck, *T. matonii* of Payraudeau, and *T. elegans* of Blainville.

29. TROCHUS WISERI, Calcara.

T. wiseri, Calc. Il Maurolico, 1841, p. 31, t. iv. f. 14.

'Porcupine' Exp. 1870: Atl. St. 24; Med. 55.

Distribution. Bay of Biscay ('Travailleur' Exp. 1880 and 1881), various parts of the Mediterranean (*Tiberi* and others); 40–540 fms.

Fossil. Pliocene: Italy.

T. gemmulatus of Philippi, and *T. scabrosus* of myself not of Philippi. Distinct from *T. clathratus* of Aradas, to which Monterosato and Seguenza formerly, but not lately, referred it. It was apparently figured in pl. vi. f. 12 by Cantraine in his unfinished work, 'Malacologie méditerranéenne et littorale,' 1840, but without a name.

30. TROCHUS MILIARIS, Brocchi.

T. miliaris, Broc. Conch. foss. Subap. ii. p. 353, t. vi. f. 1.

T millegranus, B. C. iii. p. 325; v. p. 204, pl. lxiii. f. 4.

'Lightning' Exp. St. 5, 7.

'Porcupine' Exp. 1869: 1, 6, 14, 45 *a*, 45 *b*, 70, 89 (dwarf), Little Minch. 1870: Atl. 24, 25, off C. Sagres, 26–30, Tangier B.; Med. Capo di Gaeta, 45, Cartagena B., 50, Benzert Road, Adventure Bank, off Rinaldo's Chair.

Distribution. Drontheim to the Ægean and Sea of Marmara, C. Verde I. (*de Rochebrune*); 2–205 fms.

Fossil. Miocene: Vienna Basin and Touraine? Pliocene: English and Belgian Crags, S. France, and Italy. Post-tertiary: Norway, W. Scotland, and Nice; 0–50 ft.

There are several synonyms, including *T. granulatus* of de Blainville (not Born), and *T. millegranus* of Philippi, who in Küster's edition of Martini and Chemnitz gave not only the latter but also *T. miliaris* as recent species, separated from each other by many pages and plates. Some specimens or varieties differ greatly in size, or they have a higher spire and are more pyramidal; others are more finely and closely sculptured; others have quite a flattened base, while one specimen has a rounded base and no keel. In a small coarsely granulated variety the apex is twisted, and might easily be taken for a distinct species. The colour is occasionally milk-white. The fossil type or progenitor of the species is much more conical and smaller than the living species. The specific name *miliaris* is not appropriate, if it has reference to millet-seed; and it is not a Latin word.

31. TROCHUS GRANULATUS, Born.

T. granulatus, Born, Ind. Mus. Cæs. Vind. 1778, p. 343: B. C. iii. p. 327; v. p. 204, pl. lxiii. f. 5.

'Porcupine' Exp. 1869: St. 1, 45 *a*, 45 *b*. 1870: Atl. off C. Sagres; Med. Capo di Gaeta, 50, off Jijeli, 55, Benzert Road, Rasel Amoush, G. Tunis, Adventure Bank.

Distribution. British Isles, Normandy, Mediterranean, Adriatic, Mogador, Madeira, Canaries; 2–145 fms.

Fossil. Pliocene: Red and Norwich Crags, Italy, Morea, Rhodes. Post-tertiary: Ireland.

T. papillosus, Da Costa, 1778 (not S. Wood), *T. fragilis*, Pulteney (not Gmelin), *T. tenuis*, Montagu.

Variable in sculpture, which is more or less closely beaded; the spiral striæ on the lower whorls are sometimes quite smooth. The 'Porcupine' specimens which I had considered *T. multigranus* of S. Wood I now believe to be merely the present species having larger and fewer beads or tubercles. The very young shells are deeply umbilicate.

32. TROCHUS ZIZYPHINUS, Linné.

T. zizyphinus, L. S. N. p. 1231: B. C. iii. p. 330, pl. vii. f. 4; v. p. 204, pl. lxiii. f. 6.

'Lightning' Exp. St. 4, 5.

'Porcupine' Exp. 1869: Lough Foyle, Little Minch. 1870: Atl. Vigo, 25, Tangier B., Gibraltar B.: Med. Benzert Road (var. *conulus*), Rasel Amoush.

Distribution. Finmark and Faroes to the Morea and Egypt, Adriatic, Mogador, Madeira, Canaries; 0-85 fms.

Fossil. Miocene: Vienna Basin, and Marne Vaticano. Pliocene: English and Belgian Crags, Italy, Rhodes. Post-tertiary: Scotland, Ireland, S. France, Leghorn.

Var. *conulus.* Smaller and more conical.

T. conulus, L. S. N. p. 1230; Forbes and Hanley, pl. lxxiii. f. 1, 2. With every inclination to retain a Linnean species, I have endeavoured, but failed, to distinguish specifically *T. conulus* from *T. zizyphinus.* Indeed Linné admits that the former is probably a variety of the latter:—"Testa sequenti (sc. *T. zizyphino*) simillima ut fere varietas minima, etiam apice tuberculata, sed linea inter anfractus prominula; color pulcherrime variegatus."

The number of synonyms is a great disgrace to naturalists. I find 23 of them, besides at least a dozen more as species described by Risso. See also 'British Conchology,' vol. iii. pp. 332 & 333.

Extremely variable as to size, height of the spire, colour, sutural ridge and other sculpture. The apex is always more or less granulated, even in the smoothest variety or *T. lævigatus* of Philippi. Very young shells have a small umbilicus.

33. TROCHUS OCCIDENTALIS, Mighels and Adams.

Trochus occidentalis, Migh. and Ad. Proc. Boston Soc. Nat. Hist. i. p. 47, pl. iv. f. 16: B. C. iii. p. 333; v. p. 204, pl. lxxiii. f. 7.

'Lightning' Exp. St. 2, 5.

'Porcupine' Exp. 1869: St. 6, 25, 61, 68.

Distribution. Finmark and Faroes to the Dogger Bank, eastern coasts of North America; 8–150 fms.

Fossil. Pliocene: English and Belgian Crags, Messina.

T. alabastrum, Beck ap. Lovén, and *T. formosus,* Forbes.

In elucidation of the habits of this *Trochus* mentioned in 'British Conchology,' iii. p. 335, Mr. Buchanan says in his paper on the air dissolved in sea-water (Proc. R. S. Edinburgh, 1877):—"As regards the percentage of oxygen present at different depths, it diminishes from the surface to a depth of 300 fathoms, and increases from that point to lower depths." The odontophore of this and other Scandinavian species has been figured by Friele.

I have also fragments of two or three species of this section, besides very young specimens of other species of *Trochus,* from the 'Porcupine' Expeditions, none of which I have been able to identify with any known species.

OLIVIA OTAVIANA, Cantraine.

O. otaviana, Cantr. Diagn. esp. nouv. de Moll. (Bull. de l'Acad. Brux. ix. 2, 1835), p. 12; Mal. Med. t. vi. f. 13.

'Lightning' Exp. St. 6.

'Porcupine' Exp. 1869: 14, 89. 1870: Atl. C.Sagres, 24, 27, 28, 28 *a*, 30, 36; Med. 45, Capo di Gaeta, Adventure Bank. The specimens are young or mostly fragmentary; but many of them are fresh-looking, and all have evidently lived and died on the spots where they occurred.

Distribution. W. Norway (*M. Sars, Asbjörnsen, Friele, Norman,* and *J. G. J.*), Cape Breton (*de Folin*), N. Spain ('Travailleur' Exp.), Mediterranean, Adriatic, and Madeira; 20–250 fms. Submarine Telegraph-Cable between Cagliari and Bona; 1100–1500 fms.?

Monodonta tinei, Calcara (1839), *M. limbata*, Philippi (1844), *Trochus bilabiatus*, Phil. in Martini and Chemnitz ed. Küster (1846). Young and fry: *T. horridus* and *Heliciella costellata*, O. G. Costa. It will thus be seen that this remarkable and widely dispersed shell has been placed in five different genera, to which must be added *Craspedotus* of Philippi (1847) and *Danilia* of Brusina (1864). It is true that *Olivia* was proposed by Bertolini in 1810 for a genus of Polygastrica; but there is no probability of any confusion arising on that account, because these classes of the Invertebrata are so widely separated.

Family VIII. TURBINIDÆ.

1. TURBO RUGOSUS, L. S. N. p. 1234: Chemn. Conch. Cab. v. t. 180. f. 1782–85; young (as *T. calcar*), f. 1786, 7.

'Porcupine' Exp. 1870: Atl. St. 36; Med. Algesiras B., Benzert Road.

Distribution. Coasts of S.W. France and N. Spain, throughout the Mediterranean and Adriatic, Mogador, Madeira, and Canaries; 0–80 fms., living in the littoral and laminarian zones.

Fossil. Miocene: Vienna Basin (*Hörnes*), Malaga (*Duncan*), Piedmont (*Foresti*). Pliocene: Italy and Rhodes. Post-tertiary: S. France and Tuscany.

Although this common Mediterranean shell has always been recognized and known as the *T. rugosus* of Linné, the only habitat given by him was "India;" but he evidently was not acquainted with Mediterranean shells except from the works of other writers and from collections made by some of his pupils.

There are a few obsolete synonyms. The operculum is used for female ornament in Italy, and called "occhio di bue."

2. TURBO PELORITANUS, Cantraine.

T. peloritanus, Cantr. Diagn. de quelq. esp. nouv. de Moll. (1837), p. 11; Mal. Med. (1840), pl. vi. f. 22.

'Porcupine' Exp. 1870: Atl. St. 1, 2, 3*a*, 24–28*a*.

Distribution. Bay of Biscay ('Travailleur' Exp.), Mediterranean ('Washington' Exp.), G. Florida (*Pourtales*); 125–731 fms.

Fossil. Pliocene: Calabria and Sicily.

Trochus filosus, Philippi.

Var. *carinata*. Smaller, and usually having a single peripheral keel instead of several spiral ribs. *Turbo carinatus*, Cantr. *loc. cit.* f. 23 =*Trochus glabratus*, Phil. Not *Trochus carinatus* of Borson, a miocene fossil, which Hörnes placed in *Turbo*.

The body or animal is white. Young shells are umbilicate.

Perhaps that character and the operculum having a multispiral nucleus on the underside may constitute sufficient grounds to separate the present species from *Turbo*; and in that case the genus might be called *Cantrainea* in honour of the discoverer and celebrated conchologist. I have had an opportunity of examining and comparing his species and its variety through the obliging attention of M. Van den Broeck.

PHASIANELLA PULLA, Linné.

Turbo pullus, L. S. N. p. 1233.

P. pulla, B. C. iii. p. 338, pl. viii. f. 1 ; v. p. 204, pl. lxiv. f. 1.

'Porcupine' Exp. 1870: Atl. St. 8, 9, Vigo B., 26, Tangier B., Gibraltar. Young and dead shells, which were probably carried out by tidal or other currents from the littoral and sublittoral zones which this species usually inhabits. The greatest depth at which it has been noticed as living is 15 fathoms.

Distribution. From the Orkneys and Stornoway southwards to the Morea, Black Sea and Adriatic, Mogador, coast of Barbary, Madeira, Canaries, and Guadaloupe (*Beau*, fide *Petit*); 0–120 fms. Specimens from the greater and perhaps any depth beyond 15 fathoms may have been drifted.

Fossil. Pliocene: Antibes and Italy. Post-tertiary: N. Ireland and Nice.

Turbo pictus of Da Costa and several other unnecessary synonyms. Lamarck described it as *Turbo pullus*, and did not include it in his genus *Phasianella*. I regard *P. intermedia* of Scacchi and *P. tenuis* of Michaud as varieties of this common and therefore variable species. Very young specimens exhibit a small umbilical slit.

Family IX. LITTORINIDÆ.

1. LACUNA CRASSIOR, Montagu.

Turbo crassior, Mont. Test. Brit. p. 309, t. 20. f. 1.

L. crassior, B. C. iii. p. 344 ; v. pl. lxiv. f. 2.

'Porcupine' Exp. 1869: St. L. Foyle, 33.

Distribution. Spitzbergen, White Sea, Russian Lapland, N. Pacific, Greenland, G. St. Lawrence, British coasts, and Etretat; 0–12 fms.

Fossil. Post-tertiary: Belfast and Hull.

L. glacialis, Möller, *L. vestita*, Metzger, and perhaps *Turbo pallidus*, Donovan.

The characteristic canal is frequently wanting both in young and adult specimens of this species. Dr. Collingwood has always found it living and feeding on the polyparies of *Alcyonidium hirsutum*.

2. LACUNA DIVARICATA, Fabricius.

Trochus divaricatus, Fabr. Fn. Grœnl. p. 392.

L. divaricata, B. C. iii. p. 346, pl. viii. f. 2 ; v. p. 204, pl. lxiv. f. 3.

'Lightning' Exp. St. 4, 5, 7. Drifted.

'Porcupine' Exp. 1869: Donegal B.

Distribution. Arctic seas in both hemispheres, Iceland and Faroe

Isles, Finmark to Gulf of Gascony, Algiers (*Joly*)!, Greenland to New York, Alaska to N. Japan; 0–36 fms. Inhabits the laminarian zone.

Fossil. Pliocene?: Antibes. Post-tertiary: Scandinavia and British Isles; 0–1360 ft.

Variable and therefore polyonomatous. Among these names are *Turbo vinctus*, *T. quadrifasciatus*, and *T. canalis* of Montagu; *L. solidula*, *L. labiosa*, and *L. frigida* of Lovén; *L. fabricii* and *L. arctica* of Philippi; *L. fusca* of Say; and *L. pertusa* of Conrad. Brown made out of it four species of *Phasianella*, and Leach his genus *Epheria*.

3. LACUNA PUTEOLUS, Turton.

Turbo puteolus, Turt. Conch. Dict. p. 193, f. 90, 91.

L. puteolus, B. C. iii. p. 348; v. p. 205, pl. lxiv. f. 4.

'Lightning' Exp. St. 4. Drifted.

Distribution. Greenland, Iceland, and Finmark to Vigo; laminarian zone.

Fossil. Post-tertiary: Clyde beds, Portrush, Selsea and Dorset.

For the perplexing synonymy of this species I would refer to 'British Conchology.' It is connected with *L. pallidula* through Gould's *L. neritoïdea*, which I consider a variety of the latter species or an intermediate form.

1. CITHNA TENELLA, Jeffreys.

Lacuna tenella, B. C. v. p. 204, pl. ci. f. 7.

'Lightning' Exp. St. 5, 7.

'Porcupine' Exp. 1869: 4, 23, 23*a*, 36, 39–42. 1870: Atl. 1, 3, 6, 9, 16, 17, 17*a*, Setubal B., off C. Espichel, 22, 31–34; Med. 51, 54, 55.

Distribution. Between the Hebrides and Faroes ('Triton' cruise), Bay of Biscay ('Travailleur' Exp.), many parts of the Mediterranean (*Spratt*, *Nares*, *Monterosato*, Italian and French Exps.), between Gibraltar and the Azores ('Josephine' Exp.), Azores, Pernambuco, and E. of Japan ('Challenger' Exp.); 114–2050 fms.

Fossil. Pliocene: Calabria and Sicily (*Seguenza*). Post-tertiary: Greenock (*Crosskey and Robertson*)!

Var. *costulata*. More or less strongly striated lengthwise, especially on the upper whorls.

In the 'Annals & Magazine of Natural History' for July 1870 I proposed the generic name *Hela* for this species; but I afterwards found not only that the name had been preoccupied so long ago as 1830 by von Münster in the Crustacea, but that the late Mr. Arthur Adams had distinguished the same form of shell under the subgeneric title of *Cithna* in the Proceedings of the Zoological Society for 1863. His courtesy in sending me several species from Japan has satisfied me that they belong to the same genus as mine; and I therefore substitute *Cithna* for *Hela* as the generic name. It differs from *Lacuna* in being destitute of an epidermis, and in having instead of a flattened and channelled pillar an obliquely curved umbilical chink, which ends in a small but deep perforation and is enclosed by a more or less sharp and distinct ridge. The tentacles of the animal are ciliated as in *Trochus* and *Rissoa*, which is not the case in *Lacuna*. The shell varies in the comparative height of the spire, as well as in the sculpture as shown in the variety *costulata*. That variety is *Lacuna margaritifera* of Watson.

2. CITHNA CINCTA[1], Jeffreys. (Plate XX. fig. 8.)

SHELL globosely conical, thin, opaque, rather glossy: *sculpture*, a few and remote spiral striæ, of which there are from 3 to 6 on the last whorl and 1 or 2 on the penultimate and other whorls; the most prominent of these striæ is one below the suture, which gives the whorls a somewhat carinated appearance; this stria is minutely tubercled on the upper whorls: *colour* white: *spire* turreted, ending in a twisted point: *whorls* 5, swollen; the last exceeds two fifths of the whole shell, the others gradually enlarging: *suture* deep: *mouth* circular, bluntly angulated at the base: *outer lip* thin, slightly expanding, and folded over the pillar: *inner lip* attached to the pillar: *umbilicus* shallow, enclosed by a semicircular ridge and ending in a small but deep perforation. L. 0·1, B. 0·1.

'Porcupine' Exp. 1870: Atl. St. 16. Two specimens.

3. CITHNA CARINATA[2], Jeffreys. (Plate XX. fig. 9.)

SHELL compactly pyramidal, thin, opaque, glossy: *sculpture* consisting of a single keel which surrounds the periphery or middle of each whorl and makes it angular; under the microscope the surface appears closely granular or fretted; the base is encircled by a few slight striæ: *colour* white, except as to the uppermost whorls, which are as in *C. tenella* yellowish-brown: *spire* turreted, ending in a symmetrical apex: *whorls* 5–6, angulated, flattened between the suture and the keel, regularly increasing in size: *suture* very deep: *mouth* quadrangular, sharply pointed at the base: *outer lip* thin, reflected behind: *inner lip* narrow, attached to the pillar: *umbilicus* saucer-shaped, enclosed by a slight and inconspicuous ridge and terminating in a small perforation. L. 0·1, B. 0·1.

'Porcupine' Exp. 1870: Atl. St. 16. A single specimen.

4. CITHNA ADAMSI[3], Jeffreys. (Plate XX. fig. 10.)

SHELL having the shape of a *Helix*, nearly globular, thin, semitransparent, and glossy: *sculpture* none except the umbilical ridge: *colour* white: *spire* rather short: *whorls* 4½, convex, the last occupying more than two thirds of the shell, and the others being in the same relative proportion; apex slightly twisted: *suture* very deep: *mouth* circular, bluntly pointed at the base: *outer lip* thin, folded partly over the umbilicus: *inner lip* adhering to the pillar: *umbilicus* small and narrow, enclosed by a sharp and nearly semicircular ridge; perforation scarcely perceptible. L. 0·0625, B. 0·075.

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[1] Encircled.

[2] Keeled.

[3] Named in honour of the memory of the late eminent malacologist Mr. Arthur Adams.

'Porcupine' Exp. 1870: Atl. St. 16, 17, 17*a*. Five specimens, more or less imperfect but characteristic.

5. CITHNA NATICIFORMIS[1], Jeffreys. (Plate XX. fig. 11.)

SHELL obtusely triangular with an eccentric spire, thin, semitransparent, and glossy: *sculpture*, a few rather strong spiral striæ on the base or underside, besides the usual umbilical ridge: *colour* white; *spire* very short: *whorls* 3, convex, the last occupying three fourths of the shell; apex bulbous: *suture* very deep: *mouth* nearly circular, large and expanding: *outer lip* thin, angulated above: *inner lip* filmy: *umbilicus* large, enclosed by a sharp curved ridge or stria (sometimes by an outer and an inner stria), and ending in a small but deep perforation. L. 0·075, B. 0·1125.

'Porcupine' Exp. 1870: Atl. St. 17*a*. Three more or less imperfect specimens. This differs from the last species in shape, sculpture, shorter spire, and fewer whorls.

1. LITTORINA OBTUSATA, Linné.

Turbo obtusata, L. S. N. p. 1232.

L. obtusatus, B. C. iii. p. 356; v. p. 205, pl. lxv. f. 1.

'Porcupine' Exp. 1869: St. 9. Dead, and probably drifted by a current or voided by a fish.

Distribution. Yenissei G., Novaia Zemblia, White Sea, Iceland, Faroes, Finmark to Gibraltar, Mediterranean ?, Azores (*McAndrew*), Davis Strait to New York; 0–15 fms. Living in the littoral and laminarian zones. The recorded localities in the Mediterranean are Toulon (*Gay*), S. France (*Petit*, fide *Michaud*), Malaga (*McAndrew*)!, Ajaccio (*Requien*), Corsica (*Susini*) !, and Sicily (*Philippi*, *Bivona*, *Gemellaro*, and others).

Fossil. Post-tertiary: Scandinavia, British Isles, S.W. France, and Canada; 0–1360 ft.

Principal synonyms—*Nerita littoralis*, Linné, *Turbo retusus*, Lamarck, and *Littorina arctica*, Möller; and as some of the varieties *T. palliatus*, Say, *T. fabalis*, Turton, and *L. limata*, Lovén.

Mr. Duprey found in Jersey a monstrous specimen which had 3 tentacles and 3 eyes. The middle tentacle was bifid; and the eye belonging to it was double and presented two small points in juxtaposition. The other eyes were simple or regular.

2. LITTORINA RUDIS, Maton.

Turbo rudis, Mat. Nat. Hist. and Antiq. West. Counties, 1797, p. 277.

L. rudis, B. C. iii. p. 364; v. p. 206, pl. lxv. f. 3, 3 *a*, 3 *b*.

'Lightning' Exp. St. 5. Probably drifted.

'Porcupine' Exp. 1869: Donegal B., Lough Swilly. 1870: Atl. Vigo B.

Distribution. Coasts of N. Atlantic on both sides, from Spitzbergen to Lisbon and Davis Strait to Staten I. in the U. S., Iceland, Vancouver I., N. Japan, White Sea, Azores, Algiers (*J. W. Flower*), Minorca (*Cardona* fide *Hidalgo*), Naples (*Scacchi*), Adriatic, and Black Sea; littoral. A dead specimen was dredged by Prof. G. O. Sars among the Loffoden Isles in 200–300 fathoms, and other dead specimens have been dredged elsewhere at considerable depths; but all of them were probably transported by tidal or marine currents.

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[1] Shaped like a *Natica*.

Fossil. Pliocene: Norwich Crag. Post-tertiary: Scandinavia, British Isles, and Canada; 0–1360 ft.

Turbo saxatilis of Olivi, 1792. This name has certainly precedence of *rudis* by five years; but the latter name was adopted by Lamarck and has been in general use and acceptation for nearly a century. I think therefore that it will not be expedient now to make the change. Among the synonyms of this variable species may be mentioned *T. jugosus* and *T. tenebrosus* of Montagu, *T. obligatus* and *T. vestitus* of Say, possibly *T. purpureus* of Risso, *L. grœnlandica* of Bolten, and other synonyms of Fabricius, Gould, Philippi, Middendorff, Pfeiffer, Brown, Johnston, Menke, Bean, Adams, and Reeve. The oldest name by far is that of Lister (*Nerita reticulatus* &c.); but it is not quite binomial.

3. Littorina litorea, Linné.

Turbo littoreus, L. S. N. p. 1232.

L. litorea, B. C. iii. p. 368, pl. viii. f. 3; v. p. 206, pl. lxv. f. 4.

'Porcupine' Exp. 1869: St. Donegal B.

Distribution. White Sea, Faroes and Nordland to Lisbon, eastern coasts of N. America from Newfoundland to New England, many places in the Mediterranean and Adriatic but requiring identification; sublittoral. As this common species, called in England the 'periwinkle,' is a favourite delicacy of sailors, the occasional occurrence of its shell in foreign parts may possibly be thus accounted for.

Fossil. Pliocene: Red and Norwich Crag. Post-tertiary: Scandinavia, British Isles, and S.W. France; 0–1360 ft.

There are a few antiquated and obsolete synonyms, including *Turbo ustulatus* of Lamarck. *L. squalida* of Broderip and Sowerby from the arctic ocean, and *L. grandis* of Middendorff from the Sea of Okhotsk appear to be varieties; and *L. mandschurica* of von Schrenck is a dwarf and eroded form, like that from Southend which I noticed in vol. iii. p. 373 of 'British Conchology.'

Genus Iphitus[1], Jeffreys.

Shell conical, covered with spiral rows of tubercles; the apex consists of a cylindrical process of several whorls, which is closely striated lengthwise; *operculum* horny, paucispiral with a lateral nucleus.

The unique and remarkable little shell which I am about to describe somewhat resembles in shape and sculpture a fossil of the Zanclean or Lower Pliocene formation at Messina which Professor Seguenza kindly sent me under the manuscript name of *Gemmula asperata*. But *Gemmula* of that author is a subgenus of *Trochus*, typified by *T. gemmulatus* of Philippi[1]. The peculiar apex may be compared to the stiliform process of *Ianthina* and *Stilifer*; and there are several other genera, such as *Cæcum* and *Turritella*, in which the embryonic spire, which had become useless for the occupancy of the mollusk, is decollated or plugged up. The present genus is allied to *Fossarus*.

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[1] One of the Argonauts.

Iphitus tuberatus[2], Jeffreys. (Plate XX. fig. 12.)

Shell forming a short cone, solid, opaque, of a dull hue: *sculpture*, spiral ridges covered with numerous minute tubercles or beads; there are four or five of these ridges on the last whorl, three on the penultimate, and two on the preceding whorl; the base is also encircled by fine spiral striæ; the stiliform process had been broken off, but sufficient remains to show that it was closely striated lengthwise, as in the fossil species which I have noticed: *colour* white with a faint tinge of yellow: *spire* rather short: *whorls* 3, besides the stiliform process; the last or body-whorl is three or four times the size of all the others put together; the point of the stiliform or cylindrical process in the fossil shell is slightly twisted and blunt: *suture* deep: *mouth* rounded, angulated above: *outer lip* sharp, scalloped by the spiral ridges, expanded and reflected at the base of the pillar; *inner lip* wanting or inconspicuous: *umbilicus* none: *operculum* yellowish-brown, having four or five volutions, the innermost being very small; these are crossed by curved and numerous striæ in the line of growth, as in species of *Littorina*. L. 0·075, B. 0·05.

'Porcupine' Exp. 1870: Atl. St. 6. A single but living specimen.

Summary of the foregoing List.

Families.	Genera.	No. of species.
VI. SCISSURELLIDÆ	Scissurella	3
VII. TROCHIDÆ	Mölleria	2
	Cyclostrema	13
	Tharsis	1
	Ganesa............	2
	Circulus..........	1
	Trochus	32
	Olivia	1
VIII. TURBINIDÆ..........	Turbo	2
	Phasianella	1
IX. LITTORINIDÆ	Lacuna............	3
	Cithna............	5
	Littorina	3
	Iphitus............	1
	Total	70

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[1] The same name (*Gemmula*) was also proposed by Weinkauff to distinguish a group or section of the genus *Pleurotoma*.

[2] Covered with tubercles.

EXPLANATION OF THE PLATES.

PLATE XIX.

Fig. 1. *Scissurella umbilicata*, p. 88.
2. *Cyclostrema tenerum*, p. 91.
3. —— *valvatoïdes*, p. 92.
4. —— *simile*, p. 92.
5. —— *affine*, p. 92.
6. —— *bithynoïdes*, p. 93.
7. *Tharsis romettensis*, p. 93.
8. *Ganesa pruinosa*, p. 94.
9. —— *nitidiuscula*, p. 94.

PLATE XX.

Fig. 1. *Trochus fulgidus*, p. 95.
2. —— *minutulus*, p. 95.
3. —— *laminarum*, p. 95.
4. —— *cancellatus*, p. 96.
5. —— *cinctus*, var. *affinis*, p. 98.
6. —— *euspira*, p. 98.
7. —— *delicatus*, p. 101.
8. *Cithna cincta*, p. 111.
9. —— *carinata*, p. 111.
10. —— *adamsi*, p. 111.
11. —— *naticiformis*, p. 112.
12. *Iphitus tuberatus*, p. 114.

3. On a Species of *Myzomela* from the Island of Boeroe.

By HENRY O. FORBES, F.Z.S.

[Received February 20, 1883.]

On a recent journey, unfortunately of very short duration, which I made in the island of Boeroe, one of the Ceram group, I was able to reach the but thrice previously visited lake of Wakolo lying in the very centre of the island. Here I was fortunate enough to obtain several specimens of a beautiful species of scarlet *Myzomela*, which I cannot identify with any of the species of which diagnoses have been given by Mr. W. A. Forbes in his paper in the P. Z. S. 1879, pp. 256 *et seqq.* I did not meet with any specimens of this bird in the country passed through in our eight days' journey up to the lake. The natives say it does not occur near the coast. About the lake itself it seemed by no means uncommon, and was mostly to be found in the fields cultivated by the Aléfuros, but which they would not allow a stranger to enter. The women who went daily to fetch the produce of these fields, brought me large numbers of this bird alive tied together by a string, which they caught by smearing the trees with "gutta;" consequently most of the specimens were in a condition unfit for preservation. By offering, however, a higher remuneration for good specimens, I obtained a few in very fair condition. All are males however: only one appears to be in full plumage; two are nearly so; and several are young birds.

The full-dress bird is entirely scarlet, the bases of the feathers being black; the wings, the tail, and the preocular spot are black; the upper wing-coverts are black with a scarlet band on the outer webs nearly in the middle, but not extending to the extremity of the feather; the inner margins of the remiges are white; the irides are rich brown; the edges of the lower maxilla yellow; tongue yellow; legs and feet yellowish green; soles yellow.

The young male is at first almost entirely greyish brown; the throat is pale grey; but quite below the maxilla and under the eyes the orange-red colour indicates the coming scarlet; the back is greyish brown, but of a deeper colour in the uropygial region; the wings and the tail are brownish grey; the breast and under tail-coverts greenish fulvous; the margins of the upper wing-coverts pale fawn-colour with, in some lights, reflections of red; the margins of the remiges are olive-grey; the throat, the front of the head, the breast, and the uropygial region are the first to assume the scarlet colour of the adult; the angle of the wing has a dirty-white spot, which, with the olive-grey margins of the remiges, are the last to change to black.

The description of *M. pusilla*, as given on page 276 of the P. Z. S. for 1879 by Mr. W. A. Forbes, might apply to the bird under remark; but as I have access to no library here, and have no specimens with which to compare my skins, I have not the means of satisfactorily determining them. Should this turn out to be a new species, it might bear the name of MYZOMELA WAKOLOENSIS.

At all events I am happy in being able to extend our knowledge of the distribution of this lovely genus to the Ceram group.

Amboina, December 15, 1882.

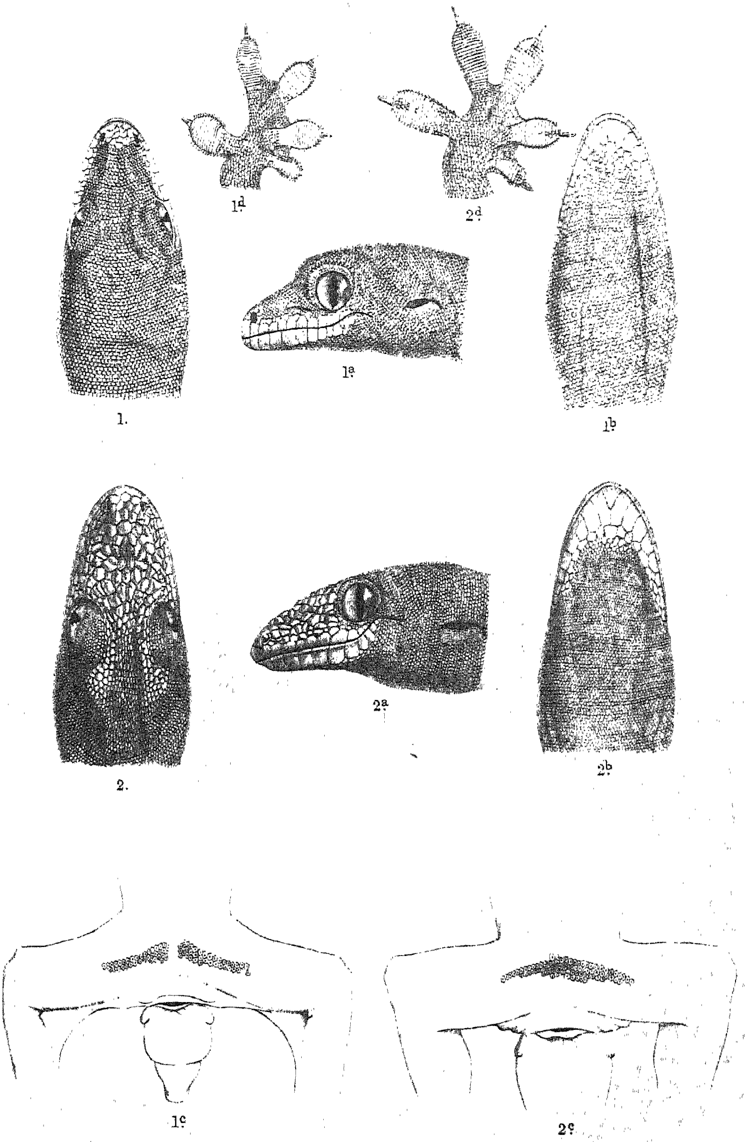
4. On the Geckos of New Caledonia.

By G. A. BOULENGER, F.Z.S.

[Received February 26, 1883.]

(Plates XXI. & XXII.)

The object of this paper is to serve as a guide to the identification of the Geckonidæ of New Caledonia, and to put order into their synonymy. As may be seen from the following bibliographical list, a good deal has been written on the subject before; but, in their endeavours to identify the species described by them with those described by M. Bavay, the subsequent authors have in many cases added to the confusion. Having, through the kindness of Messrs. Bavay, Barboza du Bocage, and Sauvage, enjoyed the advantage of studying the typical specimens described by those gentlemen, which seemed to require reexamination, I have arrived at such results as will be of some use to the student of the New-Caledonian fauna and to herpetologists generally; for a glance at the synonymies of the species will show how great was the confusion. Without bringing together and comparing carefully the typical specimens in the museums of

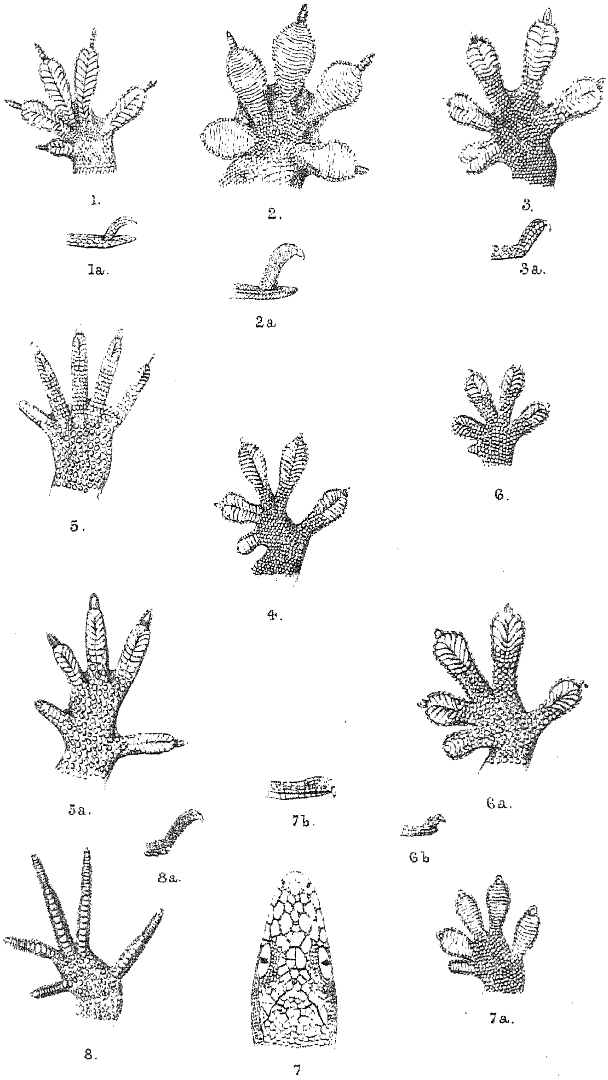


Edwin Wilson, del. et lith.

Mintern Bros imp.

GECKOS OF NEW CALEDONIA.

P. Z. S. 1883. Pl. XXII.



Edwin Wilson, del et lith.
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GECKOS OF NEW CALEDONIA.

Brest, Lisbon, Paris, and Brussels with those in the British Museum, this work could not have been carried out; and I beg leave to express my sincere thanks to the heads of those scientific establishments for having enabled me to fulfil my object.

In order to render this paper a more useful guide, I have given a short description of every species. These are all original, and taken from typical or well-authenticated specimens. The synonyms referring to New-Caledonian specimens are preceded by *.

The number of species of Geckonidæ actually known from New Caledonia is fourteen; two are recorded here for the first time, one being new to science.

The following is a list of what has been published on the subject:—

1866. A. GUICHENOT. "Notice sur un nouveau genre de Sauriens de la famille des Geckotiens." Mém. Soc. Sc. Nat. Cherb. xii. pp. 248–252, pl. viii.

1869. A. BAVAY. "Catalogue des Reptiles de la Nouvelle Calédonie et description d'espèces nouvelles." Mém. Soc. Linn. Normand. xv. 37 pp. Also separately, Caen, 1872.

1873. A. GÜNTHER, in BRENCHLEYS' work, 'The Cruise of H.M.S. 'Curaçoa,'' describes, p. 407, *Peripia cyclura* from New Caledonia. Also Ann. & Mag. N. H. (4) x. p. 422 (1872).

1873. J. V. BARBOZA DU BOCAGE. "Geckotiens nouveaux ou peu connus de la Nouvelle Calédonie." Jorn. Sc. Lisb. iv. pp. 201–207.

1878. G. A. BOULENGER. "Description d'un genre nouveau et d'une espèce nouvelle de la famille des Geckotides." Bull. Soc. Zool. France, 1878, pp. 68–70, pl. ii.

1878. H. E. SAUVAGE. "Note sur les Geckotiens de la Nouvelle Calédonie," Bull. Soc. Philom. (7) iii. pp. 63–73.

1879. G. A. BOULENGER. "Sur l'identité spécifique de *Chameleonurus trachycephalus* et *Platydactylus chahoua*," Bull. Soc. Zool. France, 1879, pp. 141, 142.

1881. J. V. BARBOZA DU BOCAGE. "Nota sobre a synonymia de alguno saurios da Nova Caledonia." Jorn. Sc. Lisb. 1881, pp. 126–132.

The Geckos of New Caledonia belong to six genera, for the determination of which the following synopsis will suffice:—

I. Digits strongly dilated, the distal phalanges slender, compressed, quite free, exserted from considerably within the extremity of the basal dilatation.

A. Inner digit with free, clawed, distal phalanx; a double series of large lamellæ under the dilated portion of the digits .... 1. *Hemidactylus*, Cuv., p. 118.

B. Inner digit without free phalanx, clawless; a transverse or angular series of narrow lamellæ under the dilated portion of the digits .... 2. *Gehyra*, Gray, p. 119.

II. Digits more or less dilated, all but the inner with the distal joint compressed, short, clawed.	
A. Inner digit clawless; two series of oblique infradigital lamellæ divided by a median groove	3. *Lepidodactylus*, Fitz., p. 120.
B. Inner digit clawed; infradigital lamellæ transverse, not divided by a groove; tail prehensile	4. *Rhacodactylus*, Fitz., p. 123.
III. Digits strongly dilated, without compressed distal joint, all furnished with transverse, undivided lamellæ inferiorly; upper surfaces covered with large, flat, plate-like scales; tail prehensile	5. *Eurydactylus*, Sauvg., p. 129.
IV. Digits not dilated, slightly depressed at the base; the distal phalanges slender, compressed, clawed, with a series of transverse plates inferiorly	6. *Gymnodactylus*, Spix, p. 129.

1. HEMIDACTYLUS, Cuv.

1. HEMIDACTYLUS GARNOTI. (Plate XXII. figs. 1, 1 *a*.)

Hemidactylus garnotii, Dum. & Bibr. Erp. Gén. iii. p. 368; *Bavay, Cat. p. 13.

Doryura garnotii, Gray, Cat. Liz. p. 157.

Hemidactylus ludekingii, Bleek. Nat. Tijds. Ned. Ind. xvi. 1859, p. 27.

This species, first discovered in Taiti, is mentioned by M. Bavay as being found in New Caledonia; and I entertain little doubt as to the correctness of the identification. The following characters are taken from three specimens in the British Museum (South-Sea Islands, Philippines, Agam) which agree in every point with Bibron's original description:—

Head much longer than broad; snout obtusely pointed, longer than the distance between the eye and the ear-opening, once and two thirds the diameter of the orbit; forehead slightly concave; ear-opening small, rounded. Body and limbs moderate, depressed. Digits free, or with a very slight trace of web, moderately dilated. A slight but distinct fold of the skin along the flanks, and another bordering the hind limb posteriorly. Upper surfaces and throat covered with minute granular scales, a little larger on the snout; abdominal scales moderate, imbricate. Nostril pierced between the rostral and three small nasals; twelve upper and nine or ten lower labials; mental large, triangular, in contact posteriorly with a pair of pentagonal chin-shields, followed by a second smaller pair; the anterior pair of chin-shields in contact with the first infralabial and with its fellow mesially; the posterior pair separated from each other and from the labials. Tail elongate, depressed, narrower than the body, with sharp denticulated lateral edge; the scales on the upper surface very small, equal; those on the lower surface larger, imbricate, with a median series of large, transversely dilated plates. Brownish-grey above, uniform or with small indistinct darker spots; lower surfaces uniform whitish.

	millim.
Total length	129
Head	16
Width of head	10
Body	44
Fore limb	20
Hind limb	27
Tail	69

2. Gehyra, Gray.

2. Gehyra vorax. (Plate XXII. figs. 2, 2 *a*.)

Gehyra vorax, Girard, Proc. Ac. Philad. 1857, p. 197, and U. S Explor. Exped., Herp. p. 274, pl. 16. figs. 1–8.

Head longer than broad; snout longer than the distance between the eye and the ear-opening, about once and a half the diameter of the orbit; forehead with a median groove; ear-opening narrow, suboval, horizontal. Body depressed. Limbs stout, short. Digits short, subequal, strongly dilated, webbed at the base, the inferior lamellæ not divided by a median groove, gently curved. A distinct fold of the skin along the flanks, and others bordering the fore limb anteriorly and the hind limb posteriorly. Upper surfaces and throat covered with minute granular scales; abdominal scales moderate, imbricate. Nostril pierced between the rostral, the first upper labial, and five small nasals; thirteen or fourteen upper, and eleven or twelve lower labials; mental small, pentagonal, in contact posteriorly with a pair of small elongate chin-shields bordered on each side by two smaller ones. Males with a long ⌒-shaped series of femoral pores, 25 to 30 on each side. Tail rounded, tapering, scarcely depressed, covered above with very small juxtaposed scales, inferiorly with larger imbricated scales, the median series being largest. Brown above, uniform, or with darker and lighter markings; lower surfaces uniform whitish.

	millim.
Total length	237
Head	38
Width of head	29
Body	114
Fore limb	42
Hind limb	58
Tail	85

A specimen of this species from the Loyalty Islands is in the British Museum, and others from the New Hebrides, Fiji, and Norfolk Islands.

3. LEPIDODACTYLUS, Fitz.

Four species occur in New Caledonia.

I. Body moderately elongate, the fore limb measuring more than half the distance from axilla to groin.
  A. Tail flat inferiorly, with sharpish lateral edge.
    Four transverse rows of small chin-shields; males with a series of femoral pores .... 1. *lugubris*.
  B. Tail cylindrical.
    Digits strongly dilated: males with two series of præanal pores .... 2. *cyclurus*.
    Digits very feebly dilated; males with a single series of præanal pores .... 3. *sauvagii*.
II. Body much elongate, the fore limb not measuring half the distance from axilla to groin.
  Inner digit rudimental .... 4. *crepuscularis*.

3. LEPIDODACTYLUS LUGUBRIS. (Plate XXII. figs. 3, 3 *a*.)

Platydactylus lugubris, Dum. & Bibr. Erp. Gén. iii. p. 304; Jacquinot, Voy. Pôle Sud, Saur. pl. 1. fig. 1; Cantor, Cat. Mal. Rept. 16.

Lepidodactylus lugubris, Fitzing. Syst. Rept. p. 16.

Amydosaurus lugubris, Gray, Cat. Liz. p. 162.

Hemidactylus meyeri, Bleeker, Nat. Tijds. Nederl. Ind. xvi. 1859, p. 47.

Peripia cantoris, Günth. Rept. Brit. Ind. p. 110; Stoliczka, Journ. As. Soc. Beng. 1872, p. 103.

Gecko mœstus, Peters, Mon. Berl. Ac. 1867, p. 13.

* *Gymnodactylus candeloti*, Bavay, Cat. p. 13.

Peripia meyeri, Günth. Proc. Zool. Soc. 1872, p. 594.

Peripia mysorensis, Meyer, Mon. Berl. Ac. 1874, p. 129.

Peripia lugubris, Peters & Doria, An. Mus. Genov. xiii. p. 371.

* *Platydactylus (Lepidodactylus) crepuscularis*, Sauvage, Bull. Soc. Philom. (7) iii. p. 69 (nec Bavay).

Head much longer than broad; snout subacuminate, longer than the distance between the eye and the ear-opening, about once and a half the diameter of the orbit; forehead with a median groove; ear-opening small, round. Body and limbs moderate. Digits moderate, inner well developed, with a rudiment of web; inferior lamellæ numerous, seven or eight under the median fingers, eight or nine under the median toes. Upper surfaces and throat with very minute granules, a little larger on the snout; scales on the belly much larger, flat, juxtaposed or slightly imbricate. Rostral quadrangular, broad; nostril pierced between the rostral, the first upper labial, and two or three nasals, the upper separated from its fellow by one or three small internasals; eleven to thirteen upper and ten or eleven lower labials; mental small, smaller than the adjacent labials; four transverse rows of small chin-shields. Femoral pores present in the males, forming a long series angular mesially, 25 altogether. Tail flat inferiorly, with sharpish, sometimes feebly serrated lateral edge caudal scales small, flat, equal. Upper surfaces light pinkish grey or brownish, generally with a series of small blackish or purplish-brown spots on each side of the vertebral line; a purplish-brown streak from the end of the snout to the ear, passing through the eye; labials generally finely dotted with brown; lower surfaces white, immaculate.

	millim.
Total length	81
Head	11
Width of head	8
Body	33
Fore limb	12
Hind limb	17
Tail	37

This widely distributed species extends from the Malay peninsula throughout the Indian archipelago, New Guinea, and the islands of the Pacific. From New Caledonia I have examined one specimen, presented by M. Delacour to the Paris Museum, and described by Dr. Sauvage as *Lepidodactylus crepuscularis*, Bavay. One of the characters pointed out by Dr. Sauvage as distinguishing the supposed latter species from *L. lugubris*, viz. the presence of a large gland on each side of the neck, is an individual (apparently pathological) character, and occurs in many species of the family Geckonidæ.

The *Gymnodactylus candeloti* of Bavay, of which I have examined the type, is based on a badly preserved specimen of the present species.

4. Lepidodactylus cyclurus. (Plate XXII. fig. 4.)

* *Platydactylus pacificus*, Bavay, Cat. p. 8 (nec Gray).

* *Peripia cyclura*, Günth. Ann. & Mag. N. H. (4) x. p. 422, and in Brenchley's 'Curaçoa,' p. 407.

* *Lepidodactylus neocaledonicus*, Bocage, Jorn. Sc. Lisb. iv. p. 206.

* *Hemidactylus* (*Peripia*) *bavayi*, Sauvage, Bull. Soc. Philom. (7) iii. p. 71.

Head oviform, longer than broad; snout a little longer than the distance between the eye and the ear-opening, about once and one third the diameter of the orbit; ear-opening moderate, roundish. Body and limbs moderate. Digits moderate, inner well developed, with a slight rudiment of web; inferior lamellæ numerous, ten or eleven, all divided by a median groove. Upper surfaces and throat covered with very small granular scales, larger on the snout; abdominal scales larger, subimbricate. Rostral quadrangular, twice as broad as high; nostril pierced between the rostral, the first upper labial, and four or five small nasals, the upper separated from its fellow by three or five small internasals; nine to eleven upper and nine or ten lower labials; mental small, subtriangular, shorter than the adjacent labials, followed by a median chin-shield; a few other irregular chin-shields gradually passing into the granules of the throat. Males with two angular series of præanal pores; these series in contact and containing each 11 to 16 pores. Tail cylindrical, covered with small, equal, flat scales arranged in verticils. Upper surfaces brownish-grey, with more or less irregular dark brown bands across the back; sides with more or less distinct small round whitish spots; a more or less indistinct dark streak on the side of the head, passing through the eye; lower surfaces uniform whitish.

	millim.
Total length	117
Head	17
Width of head	13
Body	49
Fore limb	19
Hind limb	26
Tail	51

Five specimens, types of the species, collected by Mr. Brenchley in New Caledonia, are in the British Museum. I have also examined typical specimens of *Lepidodactylus neocaledonicus*, Bocage, and *Hemidactylus bavayi*, Sauv., which, on comparison, prove to be identical with this species.

Platydactylus pacificus of Bavay also belongs to this species, which is the most common Gecko of New Caledonia.

5. LEPIDODACTYLUS SAUVAGII, sp. n. (Plate XXII. figs. 5, 5*a*.)

* *Hemidactylus* (*Peripia*) *cyclura*, Sauvage, Bull. Soc. Philom. (7) iii. p. 72 (nec Günth.).

This species, which is known to me from a single specimen belonging to the Paris Museum, resembles the preceding in the proportions, scutellation, size, and colour, but differs in the much narrower digits, and the presence of a single series of præanal pores; this series is composed of 23 pores.

6. LEPIDODACTYLUS CREPUSCULARIS. (Plate XXII. fig. 6.)

* *Platydactylus crepuscularis*, Bavay, Cat. p. 8.

Head oviform, much longer than broad; snout as long as the distance between the eye and the ear-opening, about once and a half the diameter of the orbit; ear-opening small, vertically oval. Body much elongate, limbs short, the fore limb not measuring half the distance between axilla and groin. Digits short, free, inner very small, rudimentary; inferior lamellæ few, four or five under the median digits; the borders of the digital expansions strongly denticulated. Upper surfaces and throat covered with very small granular scales, scarcely larger on the snout; abdominal scales larger, subimbricate. Rostral quadrangular, twice as broad as high; nostril pierced between the rostral, the first upper labial and three small nasals, the upper separated from its fellow by five small internasals; 12 upper and 11 lower labials; mental small, trapezoid; no chin-shields. Male with ten præanal pores forming a short angular series. Tail cylindrical, covered with small, rhomboidal, imbricated scales; these are distinctly raised on the sides of the tail, forming a slight denticulation.

Greyish-brown above, variegated with darker, and with small round white spots; a dark streak from the tip of the snout to the shoulder, passing through the eye; above this streak and behind the eye two round white spots; a round white spot on each of the digits; lower surfaces dirty white, the belly dotted with brown.

	millim.
Total length	65
Head	8
Width of head	5
Body	28
Fore limb	8
Hind limb	11
Tail	29

This species is described from two female specimens in the British Museum, collected in New Caledonia by Mr. Brenchley, and hitherto confounded with *L. cyclurus*, and two others, male and young, the types of the species, communicated to me by M. Bavay.

4. Rhacodactylus, Fitz.

Under this name I propose to unite the Geckos which have the digits of the same structure as in the genus *Gecko* of Gray, but have besides the inner digit furnished with a sheathed claw. Accordingly *Correlophus*, Guich., *Ceratolophus*, Boc., and *Chamæleonurus*, Blgr., are referred to *Rhacodactylus*, Fitz., which was established for *Platydactylus leachianus*, Cuv., the characters upon which these genera were based not being, in my opinion, of more than subgeneric importance. This opinion, as concerns *Chamæleonurus*, has already been expressed by Prof. Barboza du Bocage; but, not having a sufficient knowledge of *R. leachianus*, and giving too great importance to the dermal appendages which characterize that species, I was not at first inclined to accept his view.

I have convinced myself that the species of this genus have the tail prehensile. As regards *P. ciliatus*, however, I have still some doubts, the specimens examined by me having that organ mutilated; but Guichenot's figure induces me to believe that such is also the case in that species.

The genus *Rhacodactylus* is confined to New Caledonia.

I. Dorsal scales uniform.
  A. Digits half-webbed.
    Rostral separated from the nostril; scales on upper surface of head considerably larger than the granules on the back .... 1. *leachianus*.
    Rostral separated from the nostril; upper surface of head covered with minute granules not larger than those of the back .... 2. *aubryanus*.
    Rostral entering the nostril; upper surface of head covered with small granular scales almost as small as those of the back .... 3. *chahoua*.

B. Digits not more than one-third webbed.
  Upper surface of head covered with very large unequal, subconical tubercles .... 4. *trachyrhynchus.*
  Hinder part of the head with knob-like prominences.. 5. *auriculatus.*
II. A ciliated crest on each side, from the upper eyelid to the back .... 6. *ciliatus.*

7. RHACODACTYLUS LEACHIANUS.

Platydactylus leachianus, Cuv. R. A., 2nd edit. ii. p. 54; Dum. & Bibr. iii. p. 315, pl. 28 f. 6; Gray, Cat. Liz. p. 160; * Bavay, Cat. p. 3.

Hoplodactglus (*Rhacodactylus*) *leachianus*, Fitzing. Syst. Rept. p. 100.

* *Rhacodactylus leachianus*, Bocage, Jorn. Sc. Lisb. iv. p. 201.

Head large, oviform, elongate; forehead concave; snout longer than the distance between the orbit and the ear-opening, a little more than twice the diameter of the orbit; ear-opening narrow, horizontal. Body and limbs moderately elongate, rather depressed; digits moderately elongate, broad, not very unequal, half-webbed; limbs bordered on each side by cutaneous folds, most developed on the anterior side of the fore limbs and on the posterior side of the hind limbs; other cutaneous folds below the rami mandibulæ, on the sides of the neck, and from axilla to groin; throat with a few cross folds. Upper surface of head covered with small irregular polygonal convex scales larger than the granules of the back, elongated and more or less distinctly keeled on the forehead and snout; rostral twice as broad as high, with a more or less distinct median division above; nostril pierced between seven or eight small nasals and the first upper labial; upper labials 17 or 18; lower labials 14 to 17, anterior very high; mental narrow, elongate wedge-shaped, about the size of the proximal labials; no regular chin-shields, but a few larger scales passing gradually into the minute granules of the throat. Scales small, granular, smallest on the lower surfaces. [Males with a large patch of præanal pores[1].] Tail cylindrical, tapering, covered with uniform, small, flat, juxtaposed scales arranged in verticils. Grey or pinkish-grey above dotted and indistinctly marbled with brown, sometimes with large whitish spots; lower surfaces white, uniform.

	millim.
Total length	325
Head	59
Width of head	46
Body	152
Fore limb	70
Hind limb	84
Tail	115

The largest species of the family *Geckonidæ* at present known. This description is taken from two female specimens (one in the

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[1] Dum. & Bibr. *l. c.*

Brussels Museum, the other in the Lisbon Museum) and a young (in the British Museum).

8. RHACODACTYLUS AUBRYANUS.

**Rhacodactylus aubryanus*, Bocage, Jorn. Sc. Lisb. iv. p. 202, and 1881, p. 127.

Agrees in every respect with the preceding, except in having the upper surface of the head covered with minute granules, not larger than those covering the back. From snout to vent 195 millim.

I have examined the unique specimen of this form, belonging to the Lisbon Museum, and, in spite of its very great resemblance to *R. leachianus*, believe it to deserve, at least till we get other specimens for comparison, specific distinction.

9. RHACODACTYLUS CHAHOUA. (Plate XXI. figs. 1, 1 *a*, 1 *b*, 1 *c*, 1 *d*.)

* *Platydactylus chahoua*, Bavay, Cat. p. 8.

General proportions of *R. trachyrhynchus*. Head oviform; snout longer than the distance between the orbit and the ear-opening; snout once and a half the diameter of the orbit; forehead concave; ear-opening narrow, horizontal. Body and limbs moderately elongate, not much depressed; digits broadly dilated, not very unequal, their border very distinctly denticulated (as in *R. ciliatus*), half-webbed; the web very short (though distinct) between the two outer toes; limbs bordered by cutaneous folds, most developed on the anterior side of the fore limbs and on the posterior side of the hind limbs; other cutaneous folds below the rami mandibulæ, on the sides of the neck, and from axilla to groin; the latter feeble; throat with irregular cross folds. Upper surfaces covered with very small equal granular scales, scarcely larger on the snout; gular scales minute, granular; abdominal scales very small, flat, juxtaposed. Rostral twice as broad as high; nostril pierced between the rostral, the first upper labial, and six or seven small nasals; thirteen or fourteen upper and twelve or thirteen lower labials; mental elongate wedge-shaped, as long as the adjacent labials, which it separates; no regular chin-shields, but a few larger scales passing gradually into the minute granules of the throat. Male with three short series of femoral pores on each side; these do not extend beyond the inner half of the thighs, and are separated from the corresponding series on the other side; I count $\begin{array}{c}16\\ \hline 15\\ \hline 5\text{ or }6\end{array}$ pores on each side, there being, besides, one or two pores indicating a fourth series; altogether 79 pores. Grey above; whitish beneath, marbled with grey, forming transverse bars on the belly.

	millim.
Total length (tail rudimentary)	140
Head	33
Width of head	22
Body	91
Fore limb	38
Hind limb	51

Of this very distinct species I have examined the type specimen, a male, kindly communicated to me by M. Bavay. It comes from Kanala, Lifou.

10. RHACODACTYLUS TRACHYRHYNCHUS. (Plate XXI. figs. 2, 2 *a*, 2 *b*, 2 *c*, 2 *d*.)

**Platydactylus duvaucelii*, Bavay, Cat. p. 6 (nec D. & B.).

**Rhacodactylus trachyrhynchus*, Bocage, Jorn. Sc. Lisb. iv. p. 203.

**Chameleonurus trachycephalus*, Bouleng. Bull. Soc. Zool. France, 1878, p. 68, pl. 2.

**Platydactylus* (*Rhacodactylus*) *chahoua*, Sauvage, Bull. Soc. Philom. (7) iii p. 66 (nec Bavay).

**Chameleonurus chahoua*, Bouleng. Bull. Soc. Zool. France, 1879, p. 142; Bocage, Journ. Sc. Lisb. 1881, p. 126 (nec Bavay).

Head oviform; snout longer than the distance between the orbit and the ear-opening, once and two thirds the diameter of the orbit; ear-opening narrow, horizontal. Body and limbs moderately elongate, rather depressed; digits broadly dilated, not very unequal, with a distinct rudiment of web, absent between the two outer toes. Sides of neck with irregular folds. Snout and interorbital space with very large, unequal, rough tubercles confluent with the cranial ossification; hinder part of head, body, and limbs with very small, equal, granular scales, smallest on the throat. Rostral broad, quadrangular, with distinct median division above; nostril pierced between the first labial and five or six small nasals, the anterior being much the largest; nine to eleven upper labials; mental small, triangular; nine to eleven infralabials, gradually decreasing in size, inner pair nearly three times as high as broad, in contact behind the mental; a row of large scales behind the labials. Body and limbs covered with very small granular scales. Tail cylindrical, with uniform small flat juxtaposed scales arranged in verticils. Male with an irregular patch of very numerous præanal pores. Head brown; the rest of the upper surfaces grey, dotted with darker; lower surfaces dirty white, with scattered grey dots.

	millim.
Total length	308
Head	38
Width of head	24
Body	115
Fore limb	50
Hind limb	66
Tail	155

This description is taken from two specimens in the British Museum and four others in the Brussels Museum. I have besides seen many others, including the specimen determined by M. Bavay as *Platydactylus duvaucelii*, D. & B. (This last-named species, of which I have examined one of the type specimens, belongs to a distinct genus, *Hoplodactylus*, Fitz.)

The synonymy of this Gecko has been lately rather confused.

I may relate how the confusion took place:—

Overlooking Bocage's description, I renamed the species in 1878 *Chamæleonurus trachycephalus*. Shortly afterwards, Sauvage redescribed it as *Platydactylus chahoua*, Bavay, which it is not, treating *Rhacodactylus trachyrhynchus*, Bocage, as a synonym. The following year I published a note in which I referred my *C. trachycephalus* to *R. trachyrhynchus* and *P. chahoua*, having been informed by Dr. Sauvage that the three forms were identical. At that time I had not at hand Bavay's excellent monograph, which had been lent to me on the former occasion by M. Lataste, and was not able to reconsult the original description of *P. chahoua*; but believing Dr. Sauvage to have examined authenticated specimens, I did not think there was any reason for suspecting the accuracy of his statement. I was afterwards informed by Dr. Sauvage that the Paris specimens had simply been compared with Bavay's description; and as the latter is not at all applicable to *R. trachyrhynchus*, I came to the conclusion that this and *R. chahoua* were distinct species. This was confirmed by the examination of M. Bavay's typical specimen.

11. **Rhacodactylus auriculatus.**

**Platydactylus auriculatus*, Bavay, Cat. p. 6.

**Ceratolophus hexaceros*, Bocage, Jorn. Soc. Lisb. 1873, p. 205.

**Platydactylus (Ceratolophus) auriculatus*, Sauvage, Bull. Soc. Philom. (7) iii. p. 67.

**Ceratolophus auriculatus*, Bocage, Jorn. Sc. Lisb. 1881, p. 130.

Head subpyramidal; snout longer than the distance between the orbit and the ear-opening, once and two thirds the diameter of the orbit, slightly swollen at the end; interorbital space and forehead deeply concave; hinder part of head with knob-like prominences, viz. one above the ear-opening, formed by the free end of the quadrate, and five others formed by the extremities of the parietal bones; the borders and sutures of the latter forming prominent ridges; the ends of the postfrontal bones and mandible also prominent; ear-opening large, oval, oblique. Body and limbs moderately elongate, rather depressed; digits not very broadly dilated, not very unequal, with a very slight rudiment of web, which is altogether absent between the two outer toes. Throat and sides of neck with a few irregular folds; a slight fold bordering the hind limb posteriorly. Head and body covered with subequal small granular scales, flattened on the belly, smallest on the throat. Rostral quadrangular, not quite twice as broad as high, with a small notch in the middle of its upper border; nostril pierced between the rostral, the first upper labial and seven small nasals, the anterior being much the largest; 16 to 18 upper, and 14 or 15 lower labials; mental small, subtriangular, separating the inner labials; no regular chin-shields, but larger scales passing gradually into the granules of the throat. Tail cylindrical, covered with uniform small juxtaposed scales arranged in verticils. Male with an irregular patch of very numerous præanal pores, and a sort of pouch in the integument of the thigh posteriorly, near the tibia. Yellowish-grey, with darker and lighter longitudinal bands on the back; flanks and limbs marbled with darker; lower surfaces dirty white, with scattered blackish dots.

	millim.
Total length	205
Head	34
Width of head	27
Body	91
Fore limb	49
Hind limb	60
Tail	80

Described from a single male specimen belonging to the Lisbon Museum.

12. RHACODACTYLUS CILIATUS.

*_Correlophus ciliatus_, Guichen. Mém. Soc. Sc. Nat. Cherb. xii. p. 249, pl. viii.; *Bavay, Cat. p. 12.

Head very large, oviform, very distinct from neck; forehead deeply concave; snout much longer than the distance between the orbit and the ear-opening, once and two thirds the diameter of the orbit; ear-opening moderately large, suboval, horizontal, slightly oblique. Body and limbs moderately elongate, depressed; digits moderate, not very unequal, strongly denticulated on the sides, half-webbed; the web, however, almost entirely absent between the two outer toes. A strong fold of the skin bordering the hind limb posteriorly; another fold from the eye to the anterior part of the back, where it is separated from its fellow by a rather narrow space; a slight fold from axilla to groin. Head covered with granular scales, largest on the snout; rostral quadrangular, twice as broad as high, with median division above; nostril pierced between the rostral, the first upper labial and six small nasals; upper labials 13, lower labials 12 or 13; mental small, wedge-shaped; no chin-shields. Dorsal scales granular, intermixed with larger conical ones on the sides of the vertebral line; the upper eyelid and the fold on the side of the head and anterior part of the back with long cilioid scales. Throat covered with small granular scales; belly with small, slightly imbricated, smooth, roundish scales. [Tail long, slender, cylindrical, covered with small juxtaposed scales; its distal extremity with a rounded flap of skin placed horizontally[1].] Yellowish or reddish-brown, lighter beneath.

	millim.
Total length (tail reproduced, rudimentary)	109
Head	33
Width of head	24
Body	68
Fore limb	36
Hind limb	46

Described from two female specimens in the Brussels Museum.

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[1] Guichenot, *l. c.*

5. EURYDACTYLUS, Sauvage.

13. EURYDACTYLUS VIEILLARDI. (Plate XXII. figs. 7, 7 *a*, 7 *b*.)

**Platydactylus vieillardi*, Bavay, Cat. p. 10.

**Eurydectylus viellardi*, Sauvage, Bull. Soc. Philom. (7) iii. p. 70.

Head not depressed, much longer than broad; snout long, obtuse, with slightly distinct canthus rostralis and scarcely oblique loreal region, measuring nearly twice the distance between the eye and the ear-opening, or once and three fourths the diameter of the orbit; pupil vertical, not round as stated by Bavay; ear-opening minute, horizontal. Body slightly compressed, the back keeled. Limbs short, digits strongly dilated, free. Scales of upper surfaces large, separated by intervals forming reticulated lines, much like crocodile-skin; the shields on the head larger, subsymmetrically arranged. Rostral twice as broad as high, with distinct median division above; nostril pierced between the rostral, the first labial and two nasals; ten upper and nine lower labials; mental small, triangular, the adjacent labials meeting behind; a few irregular chin-shields. Throat covered with small granules, with two strong transverse and two longitudinal folds. Belly covered with rather large flat granules. [Male with a triangular patch of about fifty præanal pores[1]]. Tail cylindrical, prehensive, covered with squarish juxtaposed scales arranged in verticils. Upper surfaces reddish-yellow; the interspaces between the scales forming blackish reticulated lines; lower surfaces uniform whitish.

	millim.
Total length	91
Head	15
Width of head	9
Body	39
Fore limb	14
Hind limb	18
Tail	37

Described from a female specimen in the Paris Museum.

6. GYMNODACTYLUS, Spix.

14. GYMNODACTYLUS ARNOUXI. (Plate XXII. figs. 8, 8 *a*.)

Gymnodactylus arnouxii, A. Dum. Cat. Méth. Rept. p. 44, and Arch. Mus. viii. p. 479, pl. 17. f. 5; *Bavay, Cat. p. 13; Peters & Doria, Ann. Mus. Genov. xii. p. 372.

Heteronota pelagica, Girard, Proc. Ac. Philad. 1857, p. 197, and U.S. Explor. Exped., Herp. p. 306.

Gymnodactylus girardi, Steindachn. Novara, Rept. p. 15, pl. 2. f. 3.

Gymnodactylus multicarinatus, Günth. Ann. & Mag. N. H. (4) x. 1872, p. 421, and in Brenchley, Curaçoa, p. 404, pl. 24. f. A.

Gymnodactylus (*Heteronota*) *arfakianus*, Meyer, Mon. Berl. Ac. 1874, p. 129.

Head rather large, oviform; snout a little longer than the distance between the eye and the ear-opening, about once and two fifths the diameter of the orbit; forehead concave; ear-opening small, roundish. Body short, depressed; limbs moderate. Head covered with very small granular scales; rostral subquadrangular, not twice as broad as high, with median division superiorly; nostril pierced between the rostral, the first upper labial, two small nasals, and two or three granules; seven or eight upper, and as many lower labials; mental very large, triangular, pentagonal or trapezoid, extending considerably beyond the adjacent labials, generally with a pair of chin-shields posteriorly; no other chin-shields. Upper surfaces covered with very small granules; back with 16 to 20 longitudinal series of round, subconical, distinctly ribbed tubercles; these series regular, equidistant, the tubercles generally very close together, forming lines; hind limbs with similar irregularly scattered tubercles. Gular scales minute, granular; abdominal scales very small, imbricate, keeled. Males generally with a very short, Λ-shaped series of præanal pores, seven or eight altogether. Tail cylindrical, tapering, generally with very small uniform keeled scales, occasionally intermixed with large tubercles. Brown, lighter beneath; back and limbs with more or less distinct darker transverse markings; generally a dark streak from the eye to the ear-opening.

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[1] Bavay, *l. c.*

	millim.
Total length	125
Head	18
Width of head	12
Body	42
Fore limb	19
Hind limb	29
Tail	65

This Gecko occurrs from New Guinea and Cape York, throughout the Pacific Islands to New Zealand. The British Museum possesses a specimen from the Loyalty Islands.

EXPLANATION OF THE PLATES.

Plate XXI.

Fig. 1. *Rhacodactylus chahoua*, upper view of head.
1 *a*. —— ——, profile of head.
1 *b*. —— ——, lower view of head.
1 *c*. —— ——, lower view of posterior part of body, thighs, and tail.
1 *d*. —— ——, lower view of foot.
2. —— *trachyrhynchus*, upper view of head.
2 *a*. —— ——, profile of head.
2 *b*. —— ——, lower view of head.
2 *c*. —— ——, lower view of posterior part of body, thighs, and base of tail.
2 *d*. —— ——, lower view of foot.

All the figures are of the natural size.

Plate XXII.

Fig. 1. *Hemidactylus garnoti*, lower view of foot, magnified 2 diameters.
1 *a*. —— ——, lateral view of fourth toe, magnified 2 diam.

Fig. 2. *Gehyra vorax*, lower view of foot, magnified 1½ diam.
2 *a*. —— ——, lateral view of 4th toe, magnified 1½ diam.
3. *Lepidodactylus lugubris*, lower view of foot, magnified 3 diam.
3 *a*. —— ——, lateral view of 4th toe, magnified 3 diam.
4. —— *cyclurus*, lower view of foot, magnified 2 diam.
5. —— *sauvagii*, lower view of hand, magnified 4 diam.
5 *a*. —— ——, lower view of foot, magnified 4 diam.
6. —— *crepuscularis*, lower view of foot, magnified 4 diam.
7. *Eurydactylus vieillardi*, upper view of head, magnified 1½ diam.
7 *a*. —— ——, lower view of foot, magnified 2½ diam.
7 *b*. —— ——, lateral view of 4th toe, magnified 4 diam.
8. *Gymnodactylus arnouxi*, lower view of foot, magnified 2½ diam.
8 *a*. —— ——, lateral view of 4th toe, magnified 2½ diam.

March 20, 1883.

Professor Flower, LL.D., F.R.S., President, in the Chair.

Mr. Sclater called attention to the fact that a specimen of his *Macropus erubescens* (P. Z. S. 1870, p. 126, pl. x.) was living in the Kangaroo paddock of the Zoological and Acclimatization Society's Gardens, Melbourne, Australia, and read the following extract on the subject from the 'Guide' to that Society's Gardens[1]:—

"The Euro or Roan Kangaroo (*Macropus erubescens*). The Euro is found to the north of Port Augusta, S. Australia, and it lives principally on barren rocky ranges. It is a smaller variety than the Red Kangaroo, and it has much longer and coarser hair, of a roan colour. It is difficult to procure. The fine specimen in the Society's possession was obtained through the instrumentality of Mr. R. E. Minchin, the Director of the newly formed Zoological Society of Adelaide."

Mr. Sclater laid before the Meeting a set of the sheets of a new List of British Birds which had been prepared by a Committee of the British Ornithologists' Union, and would shortly be published, and explained the principles upon which it had been constructed.

The names of all those species of which even a single example had been certainly obtained within the confines of the United Kingdom in a wild state had been inserted in the list. The names of such species as had been wrongly reported to have occurred, and of those of which the occurrence was considered to be not sufficiently authenticated, had been inserted in their proper places in the Systema, but had been enclosed in brackets and printed in smaller types.

The derivations of both specific and generic names of all the species were given, as far as they could be ascertained; and a short account of the range of each species both within the British area and externally to it was added.

The subjoined table gave an abstract of the results arrived at.

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[1] Guide to the Zoological and Acclimatisation Society's Gardens, Royal Park. By the Director of the Society. Sixth Edition. Melbourne, 1883.

SUMMARY OF BRITISH SPECIES.

		R.	S. V.	W. V.	O. V.	Total.
I.	Passeres	50	23	6	51	130
II.	Picariæ	4	4	...	10	18
III.	Striges	4	...	...	7	11
IV.	Accipitres	12	2	...	13	27
V.	Steganopodes	3	...	...	...	3
VI.	Herodiones	1	...	...	13	14
VII.	Anseres	17	1	9	17	44
VIII.	Columbæ	3	1	...	1	5
IX.	Pterocletes	...	...	...	1	1
X.	Gallinæ	7	1	...	1	9
XI.	Fulicariæ	3	2	...	2	7
XII.	Alectorides	...	...	...	4	4
XIII.	Hemipodii	...	...	...	1	1
XIV.	Limicolæ	3	13	13	19	48
XV.	Gaviæ	9	5	2	13	29
XVI.	Tubinares	4	...	...	6	10
XVII.	Pygopodes	8	...	1	6	15
		128	52	31	165	376

1. Contributions to Morphology. Ichthyopsida.—No. 2. On the Oviducts of *Osmerus*; with Remarks on the Relations of the Teleostean with the Ganoid Fishes. By Prof. HUXLEY, F.R.S.

[Received March 9, 1883.]

Nearly sixty years ago, one of the most accurate and prolific of modern anatomists and embryologists, Rathke, published a memoir on the alimentary canal and the reproductive organs of fishes[1], which is not the least valuable of its author's numerous and weighty contributions to science. At p. 122 Rathke writes:—"In certain fishes the oviducts have entirely disappeared; this is the case in the Eel, in the Sturgeon[2], in *Cobitis tænia*, and in the Lamprey. In others, however, such as the higher kinds of Salmonoids, there extends back, behind each ovary, a narrow band which may be regarded as the remains of an oviduct. In all these fishes, therefore, the central abdominal cavity must take the place of the oviduct, as it receives the eggs when they are detached, and allows them to make their exit by a single opening at its posterior extremity.

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[1] H. Rathke, "Ueber den Darmkanal und die Zeugungsorgane der Fische," Schriften der naturforschenden Gesellschaft zu Danzig, Heft iii. Band 24.

[2] Rathke, taking the structure of ordinary osseous fish as his standard, says justly enough that the "oviducts [such as these fish possess] have disappeared" in the Sturgeon. In *Cobitis barbatula* the single ovary has an oviduct of the same character as in other Cyprinoid fishes. I have not examined *C. tænia*, about which, in other parts of his memoir, Rathke's statements are full and precise.

"In the Smelts (*Stinten*), however, there passes from each ovary a band, one edge of which is attached to the dorsal, the other to the abdominal wall, so that, in each lateral half of the abdominal cavity, there is a chamber which receives the eggs when they are detached from the ovary. The two chambers ultimately unite above the anus; and, in fact, close in front of the place where, in other fishes, the oviduct is situated.

"Thus the Smelts appear to present a remarkable transition to that structure of the oviduct which alone is met with in the other classes of the Vertebrata. Instead of the oviduct having, as in these, the character of an independent tube, in the Smelts only one half of it is found, and yet this has united in such a way with the wall of the abdominal cavity that a part of this wall takes the place of the other half of the oviduct."

And, further, at page 159:—

"That a proper oviduct is absent in the Salmon tribe has already been stated, and also that they possess an analogue of that structure. This consists of a flat, narrow band, which commonly arises at the upper and posterior end of the plate-like ovary, gradually diminishes in width backwards, and finally becomes lost towards the end of the abdominal cavity. In the Salmon proper it disappears upon the air-bladder, opposite the commencement of the last fifth of the abdominal cavity, in the freshwater Trout on the sides of the intestine not far from the anus, in the *Coregoni* (Maränen) on the intestine close to its end.

"The transition from this band-like membranous process of the ovaries of the higher Salmonoids to the oviduct of most fishes is remarkably exemplified in the Smelts. In these, in fact, a delicate membranous process, a mere fold of the peritoneum, proceeds from the end of each ovary, the upper edge of which is attached to the renal organ, the lower to the wall of the abdomen. In this way a cavity lies behind each ovary, bounded externally by the wall of the abdomen, and internally by this band. When the eggs are detached they fall into these cavities, which become narrower behind, and leave the body by a common aperture which lies behind the anus. The end of the intestine lies between the two cavities; and since the left ovary lies far from the posterior end of the abdominal cavity, the singular oviduct which has just been described has, on the left side, a considerable length; the right oviduct, however, is very short, the right ovary being situated so far back."

Rathke finally observes (p. 160) that he does not consider the condition of the ovaries in the Salmonoids, Eels, and Lampreys to represent the lowest condition of these parts in fishes, but rather to result from the subdivision of the reproductive organ into two separate parts—the one productive, and the other educative.

I am not aware that, since Rathke wrote, any one has paid attention to the remarkable arrangement which he describes; and though I have often intended to look into the matter myself, it is only lately that I have carried my design into effect.

As might be expected, I have found Rathke's statements, so far as the matters of fact are concerned, perfectly accurate.

Between the latter part of January and the beginning of March of this year I have examined a number of female Smelts, and always with the same results. I may remark that the ovaries were fully developed in the former month, and that, in the first week of March, four Smelts which I obtained in very fresh condition were all females, full of detached ova and ready to spawn.

The abdominal cavity of a female Smelt, in this state, is distended by a mass of ova, which are closely compacted and coherent, but become readily detached from one another when the mass is gently agitated in water or other fluid.

When the abdominal wall of the fish is carefully slit open along the ventral median line, the mass of impacted ova has almost the appearance of a vast single ovary; and, indeed, Bloch appears to have been misled by this appearance (Rathke, *l. c.* p. 132). But it may be readily broken up and washed away; and the two ovaries are then seen, one on each side of the middle line—not opposite one another, however, but the left in the anterior, and the right in the posterior half of the abdominal cavity[1] (fig. 1, p. 135). Each ovary has the form of a half-oval plate, with the curved edge ventral and the straight edge dorsal. The latter is suspended by a narrow mesoarial fold of peritoneum from that part of the dorsal wall of the abdominal cavity which corresponds with the ventral face of the air-bladder. The line of attachment of the mesoarium is parallel with that of the mesentery and a little distance from it.

What may be termed the *body* of the ovary[2] is a broad and thin plate, and its inner face is covered by peritoneum. The ovarian artery enters the left ovary at its anterior internal angle, and then passes backwards along the middle of its inner face, giving off branches as it goes. The artery of the right ovary runs from behind along its dorsal edge, and then passes obliquely across its inner face forwards. The outer face of the body of the ovary gives rise to a great number of *ovigerous lamellæ* of a broadly triangular form, which are disposed transversely to the length of the organ and perpendicularly to its body (fig. 1, B, C).

In fish which are not ready to spawn, these ovigerous lamellæ are very thick, from the number of close-set ovisacs with which they are laden, and the clefts which separate them are extremely irregular. In those in which the abdominal cavity is full of eggs, the lamellæ from which the eggs have been discharged remain as thin plates separated by tolerably regular interspaces as wide as, or wider than, the thickness of each plate. The outer face of the ovary is not wholly occupied by the ovigerous lamellæ. On the contrary, the peritoneal layer of the inner face is continued over the ventral edge of the ovary, and ends at about a third or a fourth of the height of the outer face by a well-defined margin. Hence the outer face of the ovary appears transversely laminated only above and in the

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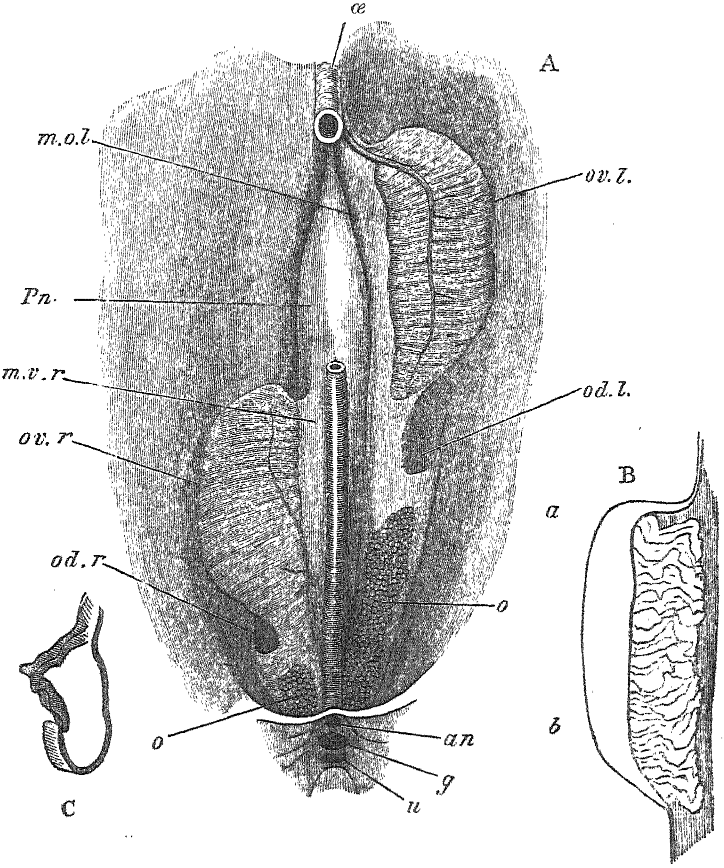
[1] *Conf.* Rathke, *l. c.* p. 135.

[2] *Conf.* Rathke, *l. c.* pp. 121 & 175.

Fig. 1.



A. The genital organs of a spawning female *Osmerus eperlanus*. natural size. B. External face of the ovary. C. Transverse section.

œ, œsophagus; *an*, anus; *Pn*, air-bladder; *od. r*, *od. l*, abdominal aperture of the right and left oviducts; *o, o*, ova filling the oviducts; *g*, external genital aperture; *m.o. r*, *m.o. l*, right and left mesoaria; *u*, urinary aperture.

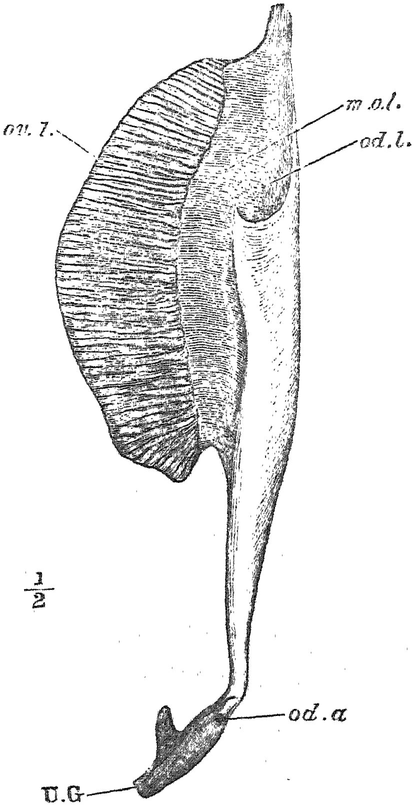
middle, while below it is bounded by a smooth thin-edged band invested by peritoneum (fig. 1, B). A transverse section shows that the ovigerous lamellæ pass under this reflected band (to which their outer edges are attached) to the ventral wall of the ovary. The groove inclosed by the reflected band is thus divided into a series of interlamellar loculi (fig. 1, C).

Thus far the ovary agrees in all the essentials of its structure with that of the other Salmonidæ, and with that of all adult Ganoids except *Lepidosteus*. Even in the latter, Balfour has shown that the ovary passes through a similar condition in the embryonic state. The mesoarium, however, does not stop at the posterior end of the ovary, but, as Rathke points out, the fold of peritoneum which constitutes it is continued backwards to the oviducal aperture; while laterally it passes into the peritoneal lining of the lateral walls of the abdomen, ending in a free concave edge immediately behind and on the outer side of the posterior extremity of the ovary. It thus forms the ventral boundary of a passage which opens in front by a wide ostium into the abdominal cavity (fig. 1, *od. l*, *od. r*). As the posterior end of the right ovary lies very far behind the posterior end of the left ovary, it follows that the right ostium is equally far behind the left, and that the right passage is by so much shorter than the left. The mesentery terminates by a free posteriorly concave edge (which contains the rectal artery) just opposite the level of the posterior end of the right ovary; and, behind this free concave edge of the mesentery, the right and left passages unite in a short but wide common chamber, which opens externally in the middle line, behind the anus and in front of the urinary outlet (fig. 1, *g*).

In a Smelt ready to spawn, these passages, as well as the common chamber, are crammed full of ova; and it is obvious that, whatever their morphological nature, they are, in a physiological sense, oviducts, comparable to Fallopian tubes.

But every one who is familiar with the anatomy of the female reproductive organs of the Ganoids, will at once perceive that these passages are the homologues of the oviducts of *Acipenser*, *Polyodon*, *Polypterus*, and *Amia* (fig. 2, p. 137). Neither in structure, nor in their essential anatomical relations, is there any difference between them. It is true that, in the Ganoids in question, the oviducts communicate with the renal ducts, and that the excretory aperture is common to the urinary and the genital apparatus, while in the Smelt there is no such communication and the oviducal and renal apertures are separate. But, among the *Sturiones* and in *Lepidosteus*, the renal are much wider than the genital ducts, and the communication between the two is effected far in front of the external aperture, while in *Polypterus* and *Amia* the oviducts are much wider than the ureters and the communication takes place near the external aperture. Thus the arrangement in *Osmerus* represents simply the third term of a series of modifications, tending towards the separation of the ureteric from the oviducal ducts, two terms of which are presented by the Ganoids. And it follows that the arrangement of the parts which obtains in the ordinary Salmonidæ is a fourth term in the same series; that is to say, the abortion of the oviducts, commenced in *Osmerus*, is completed in *Salmo*: and all that remains of the primitive arrangement is the fold described by Rathke and the so-called "abdominal pore," which, it will be observed, is the homologue of half of the urinogenital opening of the Ganoids, and has nothing to do with the "abdominal pores" of these fish and of the Selachians.

Fig. 2.



The left ovary and oviduct of *Amia culva*, half natural size.
ov. l, left ovary; *m.o. l*, left mesoarium; *od. l*, left oviduct; *od. a*, opening of the oviduct into the "bladder."

As is well known, *Lepidosteus* presents an example of a Ganoid with oviducts like those of the higher Teleostei; in *Osmerus*, on the other hand, we have a Teleostean with oviducts like those of the ordinary Ganoidei. It is tolerably obvious, therefore, taht the characters of the female reproductive organs can lend no support to any attempt to draw a sharp line of demarcation between the Ganoids and the Teleosteans.

Boas[1] has recently conclusively shown that the same is true of the supposed distinctive character afforded by the conus arteriosus; and it has long been admitted that the spiral valve which has been described in the intestine of *Chirocentrus*[2] is the homologue of that which exists in all the Ganoids, though greatly reduced in *Lepidosteus.* Indeed I am inclined to believe that the circular valve which separates the colon from the rectum in the Smelt is merely a last remainder of the spiral valve. Thus, among the supposed absolute distinctions between the Ganoids and the Teleostei, only the peculiarities of the brain, and especially the so-called chiasma of the optic nerves, remain for consideration. My lamented friend Mr. Balfour, in the last of his many valuable labours, proved conclusively that the brain of *Lepidosteus* is, both in structure and development, a Teleostean brain. But it is singular that no one, so far as I know, has insisted upon the fact, not only that the Teleostean brain is essentially similar to that of the Ganoids, but that it is exactly in those respects in which the Ganoids and Teleostei agree in cerebral structure that they differ most markedly from the Plagiostomi and the Chimæroidei.

In a communication read before this Society some years ago[3], I pointed out that the parts of the brain termed cerebral hemispheres in the Selachians arise in a very peculiar manner, the anterior cerebral vesicle becoming subdivided by a median anterior partition, and the walls of the two ventricular cavities thus formed becoming greatly thickened. The lateral walls of the undivided part of the anterior vesicle also become thickened to form the optic thalami; but these give rise to no lobular outgrowths from their upper edges[4].

In the Ganoids the anterior cerebral vesicle undergoes a totally different series of modifications, inasmuch as no median septum is developed and no lateral ventricles are produced. In the *Sturiones* the thick lateral walls of the anterior cerebral vesicle give rise to no distinct superior lobes. In *Lepidosteus,* however, as Balfour has shown, such solid lobular bodies, or *epithalami,* are developed, and, giving rise to a thickened decurved overlapping rim from their outer faces, become exactly similar to the so-called "cerebral hemispheres" of the Teleosteans. In all the Teleosteans, in fact, the bodies called "cerebral hemispheres" are not the exact equivalents of the structures so named either in the higher Vertebrata or in the Selachians, but are

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[1] "Ueber den Conus arteriosus bei *Butirinus* und bei anderen Knochenfischen," Morphol. Jahrbuch, vi. 4, 1880.

[2] Doubts have been thrown on the existence of this structure in *Chirocentrus*; so that the matter needs reinvestigation. [By the kindness of Dr. Day I have been enabled to examine a small specimen of *Chirocentrus dorab*; and I find it to possess just such an intestinal valve as that figured by Valenciennes. Whether it is truly "spiral" in its arrangement, or not, can only be determined by the examination of a larger specimen.—T. H. H., July, 1, 1883.]

[3] "On *Ceratodus forsteri*," Proc. Zool. Soc. January 4, 1876.

[4] See Balfour, 'Development of the Elasmobranchs.'

epithalami, just as in the Ganoids. Thus, in cerebral structure, as in other respects, the Ganoids and the Teleosteans are as closely related to one another as they are different from the Selachians.

With respect to the chiasma of the optic nerves, the exact nature of that structure has not yet been properly elucidated either in the Selachians or in the Ganoids. But, whatever may come of such an investigation, the establishment of the existence of a true chiasma in the Ganoids, and of its absence in Teleosteans, can have but little bearing on the question of their affinities, since Wiedersheim has shown that a simple decussation of the fibres of the optic nerves, as in ordinary Teleosteans, takes place in many Lizards.

I am no great believer in the permanent value of sharply drawn distinctions of any kind in zoology; but, assuredly, if there is any such distinction to be drawn on the basis of our present knowledge among the higher fishes, it is between the Ganoids and the Plagiostomes, and not between the Ganoids and the Teleosteans.

At page 373 of Dr. Günther's work 'On the Study of Fishes,' published in 1880, he affirms broadly and without the least qualification that, though "we find not a few analogous forms in both series" [namely the Ganoidei and the Teleostei], yet "there is no direct genetic relation between those fishes, as some naturalists were inclined to believe." I imagine that I am included among the naturalists thus summarily disposed of, since, in 1876, I expressed the opinion that "in *Amia* there is an even closer approximation between the Ganoids and the Teleosteans than can at present be shown to exist between any Ganoids and the Dipnoi; while the differences between the Dipnoi and the Chimæroidei and between the Chimæroidei and the Plagiostomi respectively are not less than those between the Ganoids and the Dipnoi"[1]; and I objected on these grounds to the adoption of the group of "Palæichthyes" proposed by Dr. Günther.

When objections are ignored without being refuted, or even discussed, I suppose that the best way is to emphasize them afresh; and I do this, on the present occasion, by expressing my conviction, first, that there are no two large groups of animals for which the evidence of a "direct genetic connexion" is better than in the case of the Ganoids and the Teleosteans; and, secondly, that the proposal to separate the Elasmobranchii, Ganoidei, and Dipnoi of Müller into a group apart from, and equivalent to, the Teleostei appears to me to be inconsistent with the plainest anatomical relations of these fishes.

2. Description of a new Species of *Bufo* from Japan.

By G. A. Boulenger, F.Z.S.

[Received February 26, 1883.]

(Plate XXIII.)

I have hesitated whether to consider the following form a distinct species or a variety of *Bufo vulgaris*. After long consideration, I adopt the former view, having little doubt that it is outside the range of variation of even so variable a species as *Bufo vulgaris*. I will call it

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[1] "On *Ceratodus forsteri*," P. Z. S. 1876.

BUFO FORMOSUS, sp. n. (Plate XXIII.)

In its general characters this species agrees with *Bufo vulgaris*, especially the Japanese form, which it resembles in the large size, the larger head, the perfectly distinct tympanum, and the black markings. But it is distinguished by the following characters:—

The tympanum, which is perfectly exposed and circular, is quite as large as the eye, and measures three fourths the greatest diameter of the orbit. The parotoids are much narrower, their width being contained three times and a half in their length. The hind limb is longer; if it is carried forwards along the body, the metatarsal tubercles reach the centre of the eye in the female, the anterior corner of the same in the male. The fingers and toes are more elongate, and the web between the latter shorter (the specimens were captured during the breeding-season, as is indicated by the male's digital asperities). The first finger being laid against the second, does not extend quite so far as the latter; in *B. vulgaris* it is the reverse, the first finger extending slightly beyond the second.

Upper surfaces brown, washed with carmine; a black lateral band as in *B. vulgaris* of Japan, bordered above by a yellowish streak; lower surfaces yellowish, the belly and the lower surface of the limbs largely marbled with black; a black line bordering the lower lip. This line is constant in the Japanese specimens of *B. vulgaris*, absent in the continental specimens.

Two specimens, male and female, were collected at Yokohama during the expedition of H.M.S. 'Challenger.'

The following dimensions should be compared with the table given in my monograph of the Palæarctic and Æthiopian species of *Bufo* (P. Z. S. 1880, p. 570[1]).

	♂. millim.	♀. millim.
From snout to vent	125	112
Length of head	35	31
Breadth of head	51	44
From eye to nostril	8	8
From eye to tip of snout	18	15
Greatest diameter of orbit	12	11
Interorbital space	13	12
Diameter of tympanum	9	8
Length of parotoids	28	21
Breadth of parotoids	8	6
Body	90	81
Fore limb	87	80
Hind limb	172	142
Tibia	47	40

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[1] Column *f*, "length of head 48 millim." is a misprint for "38 millim."

3. Note on the Respiratory Organs of *Rhea*. By W. N. Parker, Lecturer on Biology at the University College of Wales, Aberystwyth.

[Received March 12, 1883.]

In a paper read last year before this Society, "On the Respiratory Organs of *Apteryx*," Prof. Huxley gave a clear and concise account of the arrangement of the respiratory organs in Birds generally, comparing more particularly those of *Apteryx* and the Duck. To that paper the reader is referred for the explanation of the terms used in the present note.

Having had an opportunity of dissecting a specimen of *Rhea macrorhyncha* and another of *R. darwini* while working at the Society's Gardens, I examined the organs of respiration in these birds. Owing to want of time, I was unfortunately not able to go into this matter as fully as I could have wished; but as so little has been written on the subject, any facts relating thereto are worth recording. I shall therefore content myself with giving a comparison of these organs in *Rhea* with those of *Apteryx* and the Duck.

As in the Duck, the lungs of *Rhea* are considerably larger absolutely and relatively than in *Apteryx*, but the posterior ventral margin is longer than the anterior. The pulmonary aponeurosis is thick and strong as in *Apteryx*; and its mesial attachment is some distance from the median vertical septum, which, as well as the superior facet, is not so deep as in the Duck.

The oblique septum is stronger than in the Duck, but apparently not so strong as in *Apteryx*. I was unable to find any muscular fibres in it.

The general arrangement of the air-sacs in *Rhea* is much the same as in the Duck, though in some points they more nearly resemble those of *Apteryx*.

The anterior and posterior intermediate and the posterior air-sacs are almost precisely similar to those of the Duck. The dorsal end of the dissepiment between the posterior-intermediate and the posterior sac slopes backwards; and the posterior wall of the latter has been, as Prof. Huxley describes it, "apparently driven out, like a hernial sac, between the peritoneum and the parietes," projecting almost to the posterior end of the abdomen.

This pushing-out has not taken place in *Apteryx*, the whole of the posterior sac being enclosed between the oblique septum and the pulmonary aponeurosis, and thus having the same relations as the intermediates.

The subbronchial sac presents an interesting intermediate condition between that of *Apteryx* and Carinate birds. The whole of this sac in *Apteryx* is "floored by that part of the oblique septum which lies at the side of the fore part of the pericardium," while in the Duck the greater part of the sac extends forwards between the clavicles, and then fuses with its fellow to form a large median reservoir.

Thus in the latter bird this sac consists of a large azygous anterior part and of a paired posterior part.

In *Rhea* this sac is relatively considerably larger than in *Apteryx*, and extends some way in front of the level of the attachments of the coracoids to the sternum. Its cavity is encroached upon in the middle by the great vessels from the heart, which pass through it. The region behind the vessels appears to corespond to the whole sac of *Apteryx*; and the region in front to the "interclavicular" portion in the Duck. There being no furcula, the sac does not extend in front of the sternum, and the septum between the two is complete throughout.

The prebronchial sac seems to be relatively larger than in *Apteryx*, but not so much developed as in the Duck.

As in *Apteryx*, the branches of the entobronchia are less numerous than in the Duck; but otherwise they, as well as the vestibule and mesobronchium, resemble those of the latter bird. The mesobronchium gives off about ten ectobronchia, which reach to the outer surface of the lung.

Thus, on the whole, the arrangement of the respiratory organs of *Rhea* very nearly resembles that of Carinate birds; but in several points it shows an intermediate condition between the latter and *Apteryx*.

I may here mention that in *Rhea*, as in the Ostrich, the liver and stomach have a peritoneal covering which shuts them off from the other abdominal viscera. A median septum extends upwards from the sternum to the oblique septum, and is continued backwards for about 3 inches beyond the posterior margin of the former. On each side, a horizontal peritoneal septum extends between the vertical one and the body-walls, thus forming a pair of sacs. The right one encloses the right lobe of the liver, which, however, as it does not extend so far back as the posterior edge of the sternum, only fills the anterior part of the sac. On the left side the arrangement is much the same, but the posterior part of the peritoneal chamber, which on the right side is empty, is filled by the stomach. Thus the right lobe of the liver has a chamber to itself, while the left chamber contains the left lobe of the liver and the stomach. The intestines lie above as well as behind these chambers.

April 3, 1883.

St. George Mivart, Esq., V.P., in the Chair.

The Secretary read some extracts from a letter received from Mr. J. Sarbo in reference to a statement in the 'Garden Guide' (1883), p. 29, that "The Gayal (*Bibos frontalis*) is the Wild Ox of Assam, Sylhet, and the adjacent countries to the east of the Indian peninsula." Mr. Sarbo wrote as follows:—

"Firstly, *Bos gaurus*, and not *Bos frontalis*, is the Wild Ox of

Assam. The animals in the Gardens are, as you state, *Bos frontalis*, and are never found in a wild state. They are the semi-domesticated animals owned by various tribes from Assam to Arracan along our eastern frontier. Their bond to their owners is, I must admit, but slight, as they are never made use of in any way, not even being milked, except that now and then on solemn occasions one is killed and eaten. They wander at will without a herdsman in the jungles adjacent to their owners' village, and at nightfall return to the village, where their owners reward them with some rock-salt; they remain in the village all night, and at early dawn again make for the jungles. This is their only tie to man; yet, inasmuch as each individual animal is owned and can be identified by its master, and since as a rule they are so tame and docile that they will eat out of a man's hand, they cannot be called "wild." To a casual observer there may appear no difference between *Bos gaurus* (the Gaur) and *Bos frontalis* (the Gayal); but a careful inspection shows the formation of the skull and horns to differ, besides which the Gaur is the larger animal. I have lived some time in Cachar, and for seven years in the Chittagong hill-tracts, where both animals abound, during which time I have made it my study to discover if *Bos frontalis* has ever been found in a wild state; and, after making large collections of skulls from all parts of the districts, after many and minute inquiries from different tribes, who themselves acknowledge the two varieties, and after repeated discussions with European sportsmen who know both animals and who have shot many a Gaur, I have arrived at the fact that there is no such thing as a wild *Bos frontalis*. I would not have ventured, though, to put this opinion before you, had not Dr. John Anderson, Curator of the Calcutta Museum, Secretary to the Calcutta Zoological Society, and who is one of the greatest authorities on Indian natural history, written to me that he had come to this conclusion. I know both animals well; and had there been a wild *Bos frontalis*, either I or my numerous sporting friends (amongst whom is G. P. Sanderson, author of 'Thirteen Years amongst the Wild Beasts of India') would have found it and shot it. The skulls of the two kinds are so different that no mistake could be made. I have now by me three or four. Over and above this, I am almost positive that the actual animals you have in the Gardens were two of five or six obtained through my influence from chiefs on the Chittagong hill-tracts for the Calcutta Gardens, as I was informed in Calcutta that they had been sent to England to you. This being so, I can assert that neither they nor their sires or dams have been wild for many generations.

"Secondly, you write 'The Gayal is the Wild Ox of Assam, Sylhet, and the adjacent countries to the east of the Indian peninsula,' thereby clearly implying that the Wild Ox of Assam, which, as I have before said, is *Bos gaurus*, is not found except to the east of the Indian peninsula. It is too well known for there to be any argument on the subject, that besides Assam *Bos gaurus* is found in Cuttack, in the Madras presidency, and the Central Provinces; but of course this has nothing to do with *Bos frontalis*. Thirdly, though of this I will not be so positive as I am on the two other points, I have never heard of *Bos frontalis* being found even in a semi-domesticated state in Sylhet. Having lived for years in surrounding districts and knowing many persons who have lived in the district, I think indeed it is more than possible I should have heard if this animal is found in Sylhet or not."

Mr. Sclater observed that though he had always wondered at the exceeding tameness of captured specimens of this supposed Wild Ox, the fact that the Gayal was nowhere found in a wild state was quite new to him, and that, as regards the geographical distribution of this and *Bos gaurus*, he was quite willing to assent to Mr. Sarbo's corrections of his statements.

Mr. Sclater called attention to the skin of a brown Crow (*Corvus*), which had been sent to him for examination by Mr. Albert A. C. Le Souef, C.M.Z.S., of the Zoological and Acclimatization Society of Melborne. Mr. Le Souef had written of it as follows:—

"It was shot in Riverina. The gentleman who killed it sent me a similar bird alive about two years ago; and it lived in confinement about a year. On its death I showed it to Prof. McCoy of the Melbourne University; and that gentleman, after a careful examination, pronounced it an albino specimen of the Common Crow (*Corvus australis*). Its eyes, however, were brown like the colour of the feathers, in fact darker. My up-country friend moreover informs me that he has frequently seen these brown Crows in pairs, and has now sent me down the present skin."

Mr. Sclater said that he was inclined to agree with Prof. McCoy that the bird in question was only a variety in plumage of *Corvus australis*; and remarked that such varieties, although rare in a natural state, were by no means unknown, as witness the two creamy-coloured specimens of *Polyborus brasiliensis* formerly living in the Society's Gardens [1].

The following papers were read:—

1. On a Collection of Indian Lepidoptera received from Lieut.-Colonel Charles Swinhoe; with numerous Notes by the Collector. By ARTHUR G. BUTLER, F.L.S., F.Z.S., &c.

[Received March 21, 1883.]

(Plate XXIV.)

During the year 1882 I received from Col. Swinhoe (then resident at Mhow) several boxes of Lepidoptera collected by him and his assistants, chiefly at Kurrachee, Solun, and Mhow, between the years 1879 and 1882. As usual with large series from an extended area,

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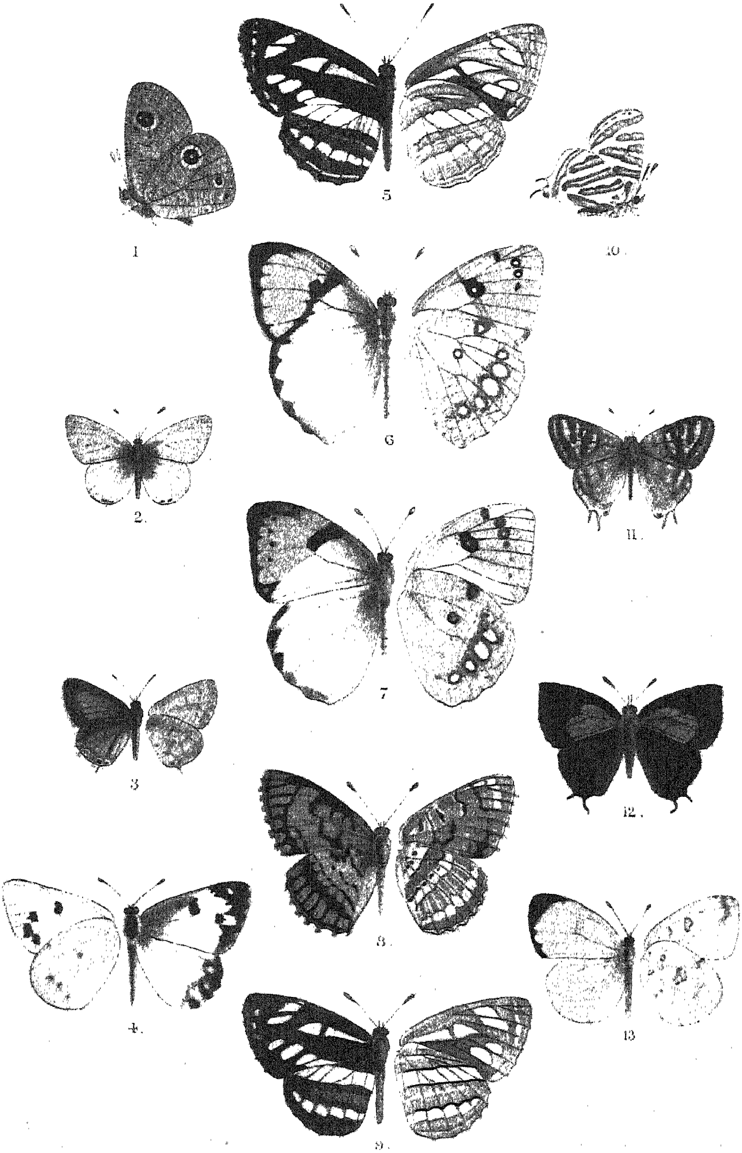
[1] See P. Z. S. 1876, p. 333, et 1878, p. 232.

P. Z. S. 1883. Pl. XXIV.



A. H. Searle del. et lith.
Mintern Bros. imp.

NEW INDIAN BUTTERFLIES.

not a few of the smaller Butterflies and of the Moths prove to be new to science.

RHOPALOCERA.

1. YPTHIMA INICA.

Ypthima inica, Hewitson, Trans. Ent. Soc. ser. 3, vol. ii. p. 284, n. 5, pl. 17. fig. 5 (1865).

Mhow, December 1881 and February 1882.

"Common here ever since November. Is, I presume, *Ypthima inica*. I have one identically the same from Paras Pani, Mirzapore district, N.W. Provinces, taken in February; but the Deesa examples are marked differently on the secondaries below."—*C. S.*

2. YPTHIMA RARA, sp. n. (Plate XXIV. fig. 1.)

Intermediate in character between *Y. norma* and *nareda*; general coloration of the former species, but like the latter in size; smoky greyish brown above, with a large bipupillated ocellus somewhat as in *Y. nareda*, but duller, less oblique, and further from the apex; no submarginal or marginal black stripes; secondaries with a small subanal ocellus, smaller and duller than in *Y. nareda*; under surface grey, densely striated with creamy whitish; no submarginal brown streaks or clouds; ocelli arranged nearly as in *Y. nareda*, but that of the primaries and the third or subanal one of secondaries differing as above. Expanse of wings 37 mm.

Mhow, October 1881.

"Not common here; one taken in September and five in October. Is like my Himalayan examples of *Y. nareda*, Kollar; but the third eye on the secondaries is much smaller, and the submarginal grey streak above and below in all four wings is absent."—*C. S.*

3. NEPTIS EURYMENE, sp. n. (Plate XXIV. fig. 5.)

Nearly allied to *N. eurynome* of Westwood, but smaller, with the costal and outer margins of primaries above straighter. Colour above blacker with purer white markings; spots on the disk smaller; secondaries with an ill-defined whitish streak in the central black belt and a slender white submarginal line: wings below of a purer ochre-yellow colour; the white markings, excepting the discoidal streak of primaries, narrower. Expanse of wings 49 mm.

Mhow, February 1882.

"Like my Aboo examples of *Neptis astola* of Moore; common here in February; have one also from Paras Pani, Mirzapore district, N.W. Provinces, taken in the same month."—*C. S.*

We also possess a *Neptis* from Mount Aboo; it however agrees on the upper surface with *N. aceris* of Europe, and on the under surface is yellow instead of red-brown. It is, in fact, the following species.

4. NEPTIS SWINHOEI, sp. n. (Plate XXIV. fig. 9.)

Only differs above from *N. aceris* in the narrower black border beyond the white discal series of spots on the secondaries; it differs from the preceding species in this character and in the reduction of the subapical series of white spots on the primaries to three, also in the absence of the submarginal white line on the secondaries; below it is yellower even than *N. eurymene*, the white cuneiform spot beyond the cell of primaries is shorter, the white band of the secondaries broader and straighter, and the yellow belt following it also broader, straighter, and less tapering; from *N. aceris* below the yellow coloration at once distinguishes it. Expanse of wings 45 mm.

Nilgherries.

"This is marked in my collection '*Neptis aceris*.' I have this also from Port Blair and from the Himalayas; have also Moore's variety *nicobarica* from British Burmah."—*C. S.*

N. nicobarica is, however, a good species.

5. NEPTIS ASTOLA.

Neptis astola, Moore, P. Z. S. 1872, p. 560.

Allied to *N. varmona*, but the submarginal series of white spots on the primaries five in number towards apex; the white subbasal band of secondaries straighter and of more even width throughout; the interrupted submarginal pale line whitish towards anal angle, but sometimes wanting; colour below red-brown, redder than in *N. varmona*; the white subbasal band of secondaries not distinctly black-edged, the reddish belt following it even and tapering towards the apex; the macular discal band a little narrower and not distinctly black-bordered; the interrupted white submarginal stripes wider. Expanse of wings 56 mm.

Belgaum.

"This also seems to be *astola*; but there are local differences between my Aboo, Belgaum, and Matheran examples."—*C. S.*

Unless these locally distinct forms are to be regarded as species, we must cease to name Lepidoptera, or, at least, confine ourselves to naming types of genera; in not a few genera we can even now form a gradational series of allied forms, constant to locality, yet exhibiting distinctive characters, which to any but those who have long studied the Lepidoptera might appear to be mere variations; their constancy however, in my opinion, warrants their separation as species.

6. HYPANIS POLINICE.

Papilio polinice, Cramer, Pap. Exot. iv. pl. 375. f. G, H (1782).

Madras[1].

7. HYPANIS SIMPLEX, sp. n. (Plate XXIV. fig. 8.)

Allied to the African *H. cora*. Wings above tawny with black markings as in little-marked females of *H. ilithyia* of Africa: on the under surface very like *H. cora*, but the black discoidal markings of primaries distinctly white-edged, the subapical white spots larger and clearer, the submarginal black band near external angle reduced to a mere undulated stripe; the first and second white bands of secondaries pure, not crossed by coloured veins, edged on both sides with black dots; submarginal white spots less widely separated; an undulated white marginal stripe in place of the pairs of white dots. Expanse of wings 41 mm.

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[1] A note sent with this species appears to refer to a form unknown to me.

One example, Depalpore, January 1882.

"Depalpore is a lake-district 30 miles north of Mhow."

"A common *Hypanis* here, at Assirghar, and at Depalpore in September and October."—*C. S.*

8. AMBLYPODIA ANITA.

Amblypodia anita, Hewitson, Cat. Lyc. B. M. p. 14, pl. 8. figs. 90, 91 (1862).

♂ ♀. Madras.

9. SURENDRA BIPLAGIATA, sp. n. (Plate XXIV. fig. 12.)

♂. Near to *S. discalis*, but easily distinguished by having no violet patches on the upper surface of the secondaries and by the grey colouring of the under surface, upon which the markings are extremely indistinct. Expanse of wings 33 mm.

Madras.

10. DEUDORIX MELAMPUS.

Papilio melampus, Cramer, Pap. Exot. iv. pl. 362. f. G, H (1782).

♂, Mhow; ♀, Solun.

"Not common here; one or two taken in September, October, and February; I have also examples from Hydrabad, Sind, and from Belgaum."—*C. S.*

11. APHNÆUS ELIMA.

Aphnæus elima, Moore, Ann. & Mag. Nat. Hist. ser. 4, vol. xx. p. 51 (1877).

Mhow, December 1881.

"Not common here (Mhow); taken in November, December, and January: five specimens in all."—*C. S.*

12. APHNÆUS BRACTEATUS, sp. n. (Plate XXIV. figs. 10, 11.)

Allied to *A. vulcanus* (the male of *A. etolus*, Cram.); from which it may be distinguished as follows:—The male above with the tawny bands almost as well developed as in the female of that species; the female with the primaries tawny excepting along the inner margin, and crossed by black bands corresponding with those of the under surface; secondaries in both sexes paler, showing the under-surface markings as dark grey bands; the tawny submarginal streak continued to apex and for the most part white in the female. Wings below creamy white, not sordid as in *A. vulcanus*, the bands narrower and of a darker duller red-colour so as to show up the silver spangles distinctly; the fifth band on the primaries free, not united to the sixth as in *A. vulcanus*; on the secondaries the large orange anal patch is wanting, so that the elbowed continuation of the fifth or submarginal band is distinctly seen; the abbreviated fourth band is also free, not united to the fifth. Expanse of wings, ♂ 27 mm., ♀ 30 mm.

Mhow, ♂ February 1882, ♀ December 1881.

"This *Aphnæus* is fairly common here from October to February."—*C. S.*

The position of this species is between *A. vulcanus* and *A. actis*.

13. TARUCUS THEOPHRASTUS.

Hesperia theophrastus, Fabricius, Ent. Syst. iii. 1, p. 281, n. 32 (1793).

Mhow, September and November 1881.

"Fairly common here from November to January. Like *nara*, but not *nara*; having the markings below in distinct spots, and not connected into lines as in *nara*: I have similar examples from Solun. Typical *nara* is occasionally found here in September and December; at least I took four or five during these months."—*C. S.*

14. CATOCHRYSOPS PATALA.

Lycæna patala, Kollar in Hügel's Kaschmir, iv. 2, p. 419 (1848).

Mhow, November and December 1881.

"Common here from October to February. Have not found the typical *cnejus* here yet; it will, however, no doubt turn up when the proper season comes round; in Kurrachee it was found in September and October."—*C. S.*

15. CATOCHRYSOPS HAPALINA, sp. n. (Plate XXIV. figs. 2, 3.)

♂. Allied to *C. ella*: above pale lilac with strong pale golden-brown reflections, which sometimes almost overpower the lilac tint; base of wings blackish and blue; a slender blackish marginal line; fringe white; secondaries with a short and very slender black tail edged with white; two white-bordered black spots near anal angle: body blackish: under surface greyish white, with faint golden tints in certain lights; markings as in *C. patala*, but less distinct; the two anal ocelli small, with no metallic scales in the type; the female, however, and such specimens of both sexes as are darker and bluer than the type above have a metallic annulus of green on each ocellus; one male taken in January has this annulus of bright gold. Expanse of wings 26 mm.

♀. Above blackish, the primaries with the exception of a broad apical patch tapering to beyond the middle of the costal border and a broad external border, suffused with bluish lilac; the secondaries with the basal three fifths, excepting towards costa, of the same colour bounded externally by a narrow band of white spots; five submarginal black spots with white borders, those of the last two touched at the back with orange and bluish scales; otherwise almost exactly as in the male. Expanse of wings 27 mm.

Mhow, October and December 1881; var. ♂, January 1882.

This species may readily be distinguished from *C. ella* by the whiter tint of the under surface and the arrangement of the spots in the transverse series across the disk of primaries, which are placed end to end in a straight line instead of angle to angle; this arrangement brings the last of the series much nearer to the external angle.

"Common in December, but one or two found in October, November, and January."—*C. S.*

What I can only regard as a dwarfed form of this species occurs commonly at Mhow in December and January. Colonel Swinhoe, however, goes further than I do, and thinks that this and other allied forms are all seasonal varieties of *C. cnejus*; he probably means *C. patala*, since *C. cnejus* has the spots across the disk of primaries below arranged angle to angle as in *C. ella*. Colonel Swinhoe further remarks that this small form (of *C. hapalina*) is as beautifully coloured as my *C. contracta*; and observes, "Certainly the *C. contracta* from Madras are really very beautifully coloured; but then, again, the most beautifully coloured *cnejus* come from Madras also—a moist part of India where all bluish-coloured Butterflies are very beautiful."

C. contracta, so far as my knowledge goes, is confined to Candahar: the under-surface markings are different in character from those of either the *C. patala* or *C. cnejus* groups; the spots of the discal series form a broken line, the upper part regular, the lower irregular. Unless such differences are admitted as of specific value, many of the best-established and hitherto universally admitted species will have to be united—an action to which few, if any, careful students of the Lepidoptera will give their sanction.

16. CATOCHRYSOPS UBALDUS.

Papilio ubaldus, Cramer, Pap. Exot. iv. pl. 390. f. L, M (1782).

Mhow, October and November 1881.

"Scarce here; one taken in September, two in October, and one in November."—*C. S.*

17. ZIZERA PYGMÆA.

Lycæna pygmæa, Snellen, Tijd. voor Ent. xix. pl. 7. fig. 3 (1876).

Mhow, November 1881.

"An uncommon *Lycæna* here; one taken in October, four in November, and three in December."—*C. S.*

18. ZIZERA INDICA.

Lycæna indica, Murray, Trans. Ent. Soc. 1874, p. 525, pl. 10. figs. 2, 3.

Mhow, December 1881 and January 1882.

Colonel Swinhoe separates this into two forms, between which, however, I fail to see any constant difference. The species is very close to *Lycæna karsandra*, of which I think it possible that it may be only a variety; the ocellated marginal series of dusky spots on the under surface of the secondaries, however, are less defined than in *L. karsandra*. Of the first series of specimens Colonel Swinhoe says, "Very common here in December and January;" and of the second, "Not common here, only eight taken in December and two in January; is smaller than any Kurrachee examples of Moore's *karsandra*, and has a tinge of blue in the fresh specimens which I never observed in the Kurrachee ones."

I must confess my inability to admit the first of these differences: some of the Kurrachee specimens which Colonel Swinhoe sent us are certainly as large as some of the Mhow specimens of *Z. indica*; the blue spot, however, is certainly brighter in the latter.

Var. *decreta*.

Smaller and paler than the preceding; the discal series of black spots across the under surface of the primaries always very large; the other markings badly defined. Expanse of wings 17–19 mm.

Mhow, December 1881 and January 1882.

I am inclined to agree with Colonel Swinhoe that this is probably a small form of the preceding. It appears, however, to be a "very common" one, and therefore may turn out to be as distinct as our *Ganoris brassicæ* and *G. rapæ* are when its life-history has been studied. It is impossible to be sure, from a mere examination of the imago, whether a butterfly or moth is a variety or a species: perhaps one of the best proofs of this may be found in the Geometrid genus *Eugonia* (*Ennomos* auct.), where the moths differ far less than the authenticated varieties of species in other genera (such as *Abraxas* for instance), yet the larvæ are widely distinct both in form and colouring.

19. TERIAS HECABE ?

Papilio hecabe, Linnæus, Mus. Lud. Ulr. p. 249 (1764).

♂ ♀. Mhow, September and November 1881.

The specimens are smaller and paler in colour than the typical Chinese form of the species. Colonel Swinhoe placed it with *T. excavata*, from which, however, it differs in the decidedly broader dark border to the secondaries and the absence of the characteristic irregular subapical brown marking on the under surface of the primaries.

20. TERIAS HECABEOIDES.

Terias hecabeoides, Ménétriés, Cat. Mus. Petr., Lep. i. p. 85, pl. 2. fig. 2 (1855).

♂. Mhow, September 1881.

"Not so deep a yellow as the *hecabe* from Kurrachee; black border on secondaries deeper than usual, deeper than any other species of the *hecabe* type in my collection. Common here in September."—*C. S.*

21. TERIAS ÆSIOPE.

Terias æsiope, Ménétriés, Cat. Mus. Petr., Lep. i. p. 85, pl. 2. fig. 3 (1855).

♂ ♀. Mhow, September and October 1881.

Of the male, which Colonel Swinhoe regarded as a variety of the preceding, he says a few were taken in September only; the females, of which he sends four examples, he regards as representing the *T. hecabeoides* of Ménétriés, of which he says he has never seen a male; he suggests therefore that *T. hecabe* is the male. Both sexes of the two species, however, can readily be distinguished by a comparison of the under surface: in *T. hecabe* and *T. hecabeoides* the irregular transverse brown subapical marking on the primaries is invariably absent and the ordinary markings are somewhat badly defined, whereas in *T. æsiope, excavata, purreea,* and their allies the reverse is the case.

22. TERIAS EXCAVATA.

Terias excavata, Moore, P. Z. S. 1882, p. 252.

♂ ♀. Assirghur, Suttara, Mhow, September to December 1881.

"That these are males and females of one species I have not the least doubt; they are plentiful here; and I have carefully observed them and have also examined over two hundred specimens." "Very common here in latter part of October and all November."—*C. S.*

23. TERIAS PURREEA.

Terias purreea, Moore, P. Z. S. 1882, p. 252.

♂ ♀. Mhow, November and December 1881, January 1882.

"Also males and females of one and the same species; I have examined 182 specimens; they commence appearing here the latter part of November, are very common all December, and a few occasionally up to date."—*C. S.*

The above notes upon two nearly allied species of the *hecabe* group are very significant, proving the utter worthlessness of the guesses which have been made of late regarding the variability of species in this group. As is the case with many allied but admittedly distincts pecies (as for instance *Brenthis selene* and *B. euphrosyne*), *Terias excavata* and *T. purreea* evidently emerge from the pupa at a distance of about a month from one another; this interval of time will not admit of the supposition that they may be seasonal forms of the same species.

24. TERIAS ASPHODELUS, sp. n. (Plate XXIV. fig. 13.)

Similar to *T. irregularis* (P. Z. S. 1882, pl. xii. fig. 3), but constantly considerably smaller; the margin of the secondaries dotted with black: below very similar to *T. fimbriata,* the spots at the extremities of the discoidal cells large, reddish with greyish centres; primaries with a well-developed transverse subapical red-brown irregular streak. Expanse of wings, ♂ 34 mm., ♀ 40 mm.

Mhow and Depalpur, December 1881 to February 1882.

Var. *narcissus.*

Smaller than the type; the border of primaries forming a regular decreasing arched band to the external angle, without a trace of the bisinuation on the median interspaces. Expanse of wings 32 mm.

Mhow, February 1882.

"Not common; a few taken occasionally from November to March."—*C. S.*

25. TERACOLUS INTERMISSUS, sp. n. (Plate XXIV. fig. 4.)

♂. Resembles on both surfaces the female of *T. ochreipennis*, excepting that the black border of the secondaries does not extend beyond the first median branch, is interrupted by three or four unequal white spots, and upon the margin is more distinctly undulated. Expanse of wings 41 mm.

Kurrachee, December 1881.

This, whether it be a species or a variety, is a highly interesting form, since it serves partly to bridge over the gap between *T. vestalis* and *T. amelia* by reproducing a character common to *T. cypræa* and allies.

26. TERACOLUS OCHREIPENNIS.

Teracolus ochreipennis, Butler, P. Z. S. 1876, p. 136, n. 34.

Kurrachee. ♂ ♀, December 1881.

"Quite common in Kurrachee in November and December."

"Apex of primaries and entire surface of secondaries below in both sexes very dark flesh-colour in all freshly emerged specimens, which fades to ochraceous in life but not after death. If you catch a perfectly fresh specimen and put it away, the dark flesh-colour keeps fairly well, even after death; if you expose the under surface to the light, the flesh-colour soon fades into a kind of ochraceous."—*C. S.*

27. TERACOLUS PUELLARIS.

Teracolus puellaris, Butler, P. Z. S. 1876, p. 136, n. 33.

♂. Kurrachee, June 1880; Larkana, July.

The specimens now sent are all males; of two marked as females, one distinctly shows the divided anal claspers, and the other has the sexual organ exserted; the females of this species are like pale undercoloured females of *T. ochreipennis*, and not yellow below as in the males.

"Very common at Kurrachee from April to August, and an odd one to be taken occasionally in every month of the year."—*C. S.*

The last part of this note must be attributed to the great similarity of the species (especially in the male sex) of this group; worn examples of one species probably continue to turn up until the appearance of the other. Small examples of the following species were associated with the specimens of *T. puellaris*. The males, when of nearly equal size, are extremely difficult to distinguish from one another; and the larger the series of specimens the more this difficulty increases; nevertheless the females are so distinct in coloration that I am unwilling without proof to regard the two forms as of one species.

28. TERACOLUS VESTALIS.

Teracolus vestalis, Butler, P. Z. S. 1876, p. 135, n. 32, pl. vii. fig. 10.

♂ ♀. Kurrachee, June 1880.

The females of this species are yellow below, as in the males; sometimes with a row of brown spots on the secondaries.

29. IXIAS KAUSALA.

Ixias kausala, Moore, Ann. & Mag. Nat. Hist. ser. 4, vol. xx. p. 49 (1877).

♂ ♀. Depalpore, December 1881, January 1882.

"Very common on the banks of the Depalpore lake in November, December, and January; not observed anywhere else in this district."—*C. S.*

Chiefly differs from what I believe to be the *I. pyrene* of Linnæus in the decidedly narrower black inner border to the apical patch on primaries.

30. IXIAS DEPALPURA sp. n. (Plate XXIV. figs. 6, 7.)

Allied to *I. agnivena* of Moore, but differing in the broader and brighter orange patch on primaries and the narrower macular border of secondaries. Wings above white; primaries with the basi-internal area almost to the middle of the wing white, tinted at base and towards the costa with bluish grey; a broad oblique black patch across the end of the cell, continued in the male as a narrow oblique black band to the external angle, so as to separate the basi-internal and apical areas; the latter area bright orange; the costal margin, apex, and external border black-brown, somewhat as in *I. mariannæ*; the disk in the female marked with four small black dots parallel to outer margin: secondaries white, with a marginal series of subconfluent squamose brown spots somewhat as in the female of *I. dharmsalæ*; base greyish. Under surface similar to that of *I. agnivena* and some examples of *I. mariannæ*, but with only four ocelloid spots towards apex upon the disk of primaries and with no large brown patch at external angle; the ocelloid spots on the secondaries are large and white with pale coffee-brown borders. Expanse of wings 48–51 mm.

Five examples. Depalpore, January 1882.

"This *Ixias* is also very plentiful at the same place in company with *I. kausala* in the same months, and has not been observed anywhere else in these parts."—*C. S.*

31. PAPILIO DIPHILUS.

Papilio diphilus, Esper, Ausl. Schmett. pl. 40 B. fig. 1 (1785–1798).

Dudhi and Shahgunge in the Mirzapore distinct, N.W. Provinces, in February 1882.

The example from Dudhi is smaller than the other; and Colonel Swinhoe regards the two as distinct local forms. This may be so; but hitherto I believe all have been regarded as varieties of *P. diphilus*; and I should be sorry, with single specimens before me, to question the correctness of this view.

32. CHAPRA MATHIAS.

Hesperia mathias, Fabricius, Ent. Syst. Suppl. p. 433 (1798).

Mhow, October to December 1881.

Colonel Swinhoe considered the specimens to represent two species; but, beyond the fact that some of them are rubbed and faded, I see no difference. Of the fresher specimens Colonel Swinhoe says—"Very common here in September, October, and November, when it is replaced by the following;" and of the faded ones—"Not very common: it is like some of my Kurrachee examples of *Pamphila mathias*; but every specimen I have captured is so worn I am not sure of it." It is of course quite natural that a Butterfly which has been two or three months on the wing should look a little different from freshly emerged specimens.

33. AMPITTIA MARO.

Hesperia maro, Fabricius, Ent. Syst. Suppl. p. 432 (1798).

Madras.

A single male example, having the fulvous patch on the secondaries broader than in our Ceylon male; the species, however, seems to be somewhat variable in this respect.

Colonel Swinhoe sends also a specimen of *Gomalia albofasciata*, but without any information respecting it, his note upon it having been lost.

34. TAGIADES MEETANA.

Tagiades meetana, Moore, P. Z. S. 1878, p. 842, pl. lii. fig. 1.

"Nilgherries; I have also one example from Belgaum."—*C. S.*

The species appears to be fairly common and widely distributed.

HETEROCERA.

SPHINGES.

A *Pergesa*, apparently the female of *P. aurifera* somewhat rubbed, is in the collection, but without any information as to locality &c.

35. CLANIS EXUSTA.

Basiana exusta, Butler, P. Z. S. 1875, p. 252, n. 37; Trans. Zool. Soc. vol. IX. p. 595, pl. xciii. fig. 4 (1876).

"Solun, in July."—*C. S.*

36. POLYPTYCHUS DENTATUS.

Sphinx dentata, Cramer, Pap. Exot. ii. p. 42, pl. 125. fig. G (1779).

Polyptychus dentatus, Butler, Trans. Zool. Soc. vol. ix. p. 583, pl. xci. fig. 10, larva (1876).

Belgaum.

"I have one also taken at Mhow in October."—*C. S.*

BOMBYCES.

37. SYNTOMIS CYSSEA.

Sphinx cysseus, Cramer, Pap. Exot. iv. pl. 355, B (1782).

Mhow, February 1882.

"Great numbers in the poppy-fields here in January and February; I took two or three here also in the flowers of the male neem tree; have also some from Solun and Umballa."—*C. S.*

MICROSEMYRA, nov. gen.

Aspect of a small *Leucania*, but more nearly allied to *Semyra*[1]. The neuration somewhat similar, but the cell of primaries longer and the veins branching and consequently shorter; secondaries with the cell short, the subcostals branching (as in *Semyra*) from a short footstalk, but the second and third median branches (unlike those of *Semyra*) emitted from a very long footstalk similarly to those of *Œonistis* (see Trans. Ent. Soc. 1877, pl. viii. fig. 18). Thorax clothed with long woolly hair-scales; palpi rather small, not extending beyond the front of the head; antennæ of the male ciliated on both sides, rather short, tapering; legs thick, especially in the male, the anterior and middle pairs short; abdomen long and scantily scaled.

38. MICROSEMYRA PALLIDA, sp. n.

Primaries creamy whitish, with a discal series of linear black dots incurved from below the third median branch; fringe traversed by two indistinct greyish lines; secondaries shining snow-white; thorax cream-coloured; abdomen testaceous, sprinkled with snow-white scales: under surface pure white; primaries of the male streaked longitudinally with grey. Expanse of wings 22 mm.

Mhow, October 1881.

"Scarce here, and only observed in October."—*C. S.*

39. PHARETRA CONSANGUIS.

Acronycta consanguis, Butler, Ann. & Mag. Nat. Hist. ser. 5, vol. iv. p. 358, n. 24 (1879).

Kasauli, in September.

40. DEIOPEIA PULCHELLA.

Tinea pulchella, Linnæus, Syst. Nat. i. 2, p. 884 (1766).

Mhow, September 1881 and February 1882; Hubb river, Nov. 1879.

Colonel Swinhoe sends a long note respecting this species, in which he suggests that it should be distinguished rather by the markings of the secondaries than of the primaries. He objects that my *D. thyter* is distinguished by the markings of the primaries, and that he can find in India no species to which my description "primaries with the scarlet spots so pale as to be scarcely visible, but the black spots large and well-defined," will apply. To these observations I answer by referring him back to my paper, where he will find (in the first place) that in the description of *D. thyter* I say "marginal black border of secondaries narrower (*i. e.* than in *D. pulchella*), the terminal quadrate projection very small;" and (in the second place) that the description quoted by him does not profess to be that of an Indian species, but of a variety of *D. pulchella* frequently occurring in Southern Africa.

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[1] I refer this genus to the *Arctiidæ*.

41. ARGINA CRIBRARIA.

Phalæna cribraria, Clerck, Icones, pl. liv. fig. 4.

Port Blair, Andamans, in June.

"I have it in many shades of colour from Bombay, Belgaum, Mahabaleshwar, and have taken it here in September, October, and November."—*C. S.*

42. AGANOPIS ORBICULARIS.

Hypsa orbicularis, Walker, Cat. Lep. Het. ii. p. 445, n. 1 (1854).

South Andamans, in July.

43. EUPLOCIA MEMBLIARIA.

Phalæna membliaria, Cramer, Pap. Exot. iii. p. 139, pl. 269. figs. C, D (1782).

♀. South Andamans, in July 1880.

Colonel Swinhoe describes a form answering to the male of this species as in his collection from Upper Tenasserim.

44. CHARNIDAS TESTACEA.

♀. *Cycnia testacea*, Walker, Cat. Lep. Het. iii. p. 683, n. 6 (1855).

Mhow, October 1881.

"Not uncommon here in September and October. I took a female also this month (March 1882); have, however, only taken one male, which is smaller and of a uniform mouse-colour; have also a light brick-dust-coloured female from the Himalayas with the transverse streak at the end of the discoidal cell, but without the dots on each side of the streak."[1]—*C. S.*

45. PACHENOME DETERSA.

♂. *Lymantria detersa*, Walker, Cat. Lep. Het., Suppl. ii. p. 365 (1865).

♂. Mhow, September and October 1881.

"Common here from September to February; I have it also from Suttara, taken in November."—*C. S.*

It is to be regretted that Colonel Swinhoe has not sent the female of this species, which is entirely unknown to me, and which would be especially interesting as indicating the relationship of the genus.

A specimen of Moore's *Artaxa pygmæa* (specific name preoccupied) was taken at Kurrachee in May 1879. Colonel Swinhoe has taken it also in February and April.

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[1] This description answers to *C. rotundata* = *C. disjuncta*, Wlk.

46. VARMMA INDICA.

Gluphisia indica, Walker, Cat. Lep. Het. v. p. 1039, n. 4 (1855).

♂. Simla.

"I have it also from Dharmsala."—*C. S.*

HYPOCALPE, gen. nov.

Allied to *Calpe,* from which it differs as follows:—Male with the antennæ comparatively shorter, much less strongly pectinated; palpi obliquely truncated, the inferior margin being longer than the superior, not acute at the tip; posterior tibiæ broader; primaries with longer costal margin, the outer margin oblique, convex, but not angulated; external angle rounded off; inner margin not excised, but with a slightly developed convexity or depressed flap towards the base; veins similar but longer beyond the cell in all the wings; secondaries with longer costal margin.

47. HYPOCALPE FASCIATA.

Calpe fasciata, Moore, Descr. Lep. Ins. coll. Atkinson, p. 151 (1882).

Solun, in July.

48. CALLÆNIA ELONGATA.

Callænia elongata, Butler, Ann. & Mag. Nat. Hist. ser. 5, vol. vi. p. 67, n. 12 (1880).

Solun, in August.

"I have it also from Kasauli, taken in September."—*C. S.*

49. INGURA SUBAPICALIS.

♀. *Abrostola subapicalis,* Walker, Cat. Lep. Het. xii. p. 883, n. 7 (1857).

Solun (one male).

Identical with *Ingura recurrens* of Walker.

50. EARIAS TRISTRIGOSA.

Earias tristrigosa, Butler, P. Z. S. 1881, p. 614, n. 60.

Kurrachee, January 1879.

This is a faded specimen, the green colour of the primaries having changed to ochreous.

"Taken at Kurrachee also in February and November, and at Assirghar in October; I have one also from Solun."—*C. S.*

NOCTUITES.

51. LEUCANIA PENICILLATA.

Leucania penicillata, Moore, P. Z. S. 1881, p. 335.

"Solun in March; common there during that month; I have it also from the Nilgherries."—*C. S.*

52. LEUCANIA RUFISTRIGOSA.

Leucania rufistrigosa, Moore, P. Z. S. 1881, p. 337.

"N.W. India" (*Moore*).

Colonel Swinhoe has lost his reference to this species, and therefore is unable to give locality or date of capture.

53. LEUCANIA PERCISA.

Leucania percisa, Moore, MS.

The clue to the locality of this species is also lost. In coll. Hocking.

54. LEUCANIA BIVITTATA.

Leucania bivittata, Walker, Cat. Lep. Het. ix. p. 108, n. 71 (1856).

Mhow, September 1881.

"In great numbers here for about a week in company with *Alaria lanceolata*."—*C. S.*

55. LEUCANIA INFERENS.

Leucania inferens, Walker, Cat. Lep. Het. ix. p. 105, n. 65 (1856).

Mhow, September 1881.

The note to *L. bivittata* applies also to this species.

56. CARADRINA ARENACEA.

Caradrina arenacea, Moore, P. Z. S. 1881, p. 349.

Umballa, in March,

57. ALETIA RUDIS.

Aletia rudis, Moore, MS.

Solun, in June. In Mr. Hocking's collection.

58. RHIZOGRAMMA INDICA.

Xylophasia indica, Walker, Cat. Lep. Het., Suppl. ii. p. 647 (1865).

Solun, in June.

"Very common in May and June at Solun in 1878."—*C. S.*

59. LAPHYGMA INFECTA.

Prodenia infecta, Walker, Cat. Lep. Het. ix. p. 196, n. 12 (1856).

♂ var. *Prodenia venustula*, Walker, *l. c.* Suppl. ii. p. 654 (1865).

♂. "Kasauli, in September, common; I have it also from the Nilgherries."

♀. "Solun; taken also at Mhow in October."—*C. S.*

60. NEURIA INCISA.

Neuria incisa, Moore, P. Z. S. 1881, p. 344.

"Solun, in June; common there."—*C. S.*

—61. MAMESTRA DOLOROSA.

Mamestra dolorosa, Walker, Cat. Lep. Het., Suppl. ii. p. 667 (1865).

"Solun. I have taken it also at Mhow in November, and at Suttara in the same month."—*C. S.*

62. MAMESTRA BRASSICÆ.

Phalæna-Noctua brassicæ, Linnæus, Syst. Nat. i. p. 516 (1766)

"Solun, in May; common there in May and June."—*C. S.*

—63. APAMEA UNDICILIA.

Apamea undicilia, Walker, Cat. Lep. Het. ix. p. 251, n. 18 (1856).

Solun.

64. PERIGEA SERVA.

Celæna serva, Walker, Cat. Lep. Het. xv. p. 1689 (1858).
Perigea canorufa, Walker, *l. c.* Suppl. ii. p. 683 (1865).
Solun.

-65. PERIGEA GALAXIA, sp. n.

♂. Primaries above dark brown, with bronzy brown reflections; ordinary lines black, commencing upon the costa in oblique snow-white dashes; the denticulated discal line very prominent, each denticle terminated externally in a white point; orbicular spot very small, with an iris of white scales, very indistinct; reniform spot large, snow-white, dotted with black and with a greyish central streak; submarginal line very irregular, chiefly indicated by a slender white external edge, external border of wing beyond this line pale; a marginal series of depressed conical black spots; fringe sordid white spotted with brown: secondaries pale bronzy brown, with a greyish tint towards outer margin; fringe cream-coloured, tipped with silvery whitish and traversed by a grey line: body corresponding in general colour with the wings. Under surface pale bronzy brown, almost golden in some lights; primaries with a greyish subtint, and the secondaries, especially towards abdominal border, with a whitish subtint; a dusky stripe beyond the cells, bisinuated in the primaries, arched and macular in the secondaries; a marginal series of black dots; fringe cream-coloured, tipped with grey; pectus silvery greyish; antennæ below reddish. Expanse of wings 30 mm.

The locality is lost; I believe, however, that it occurs at Dharmsala.

—66. ILATTIA CEPHUSALIS.

Ilattia cephusalis, Walker, Cat. Lep. Het. xvi. p. 209, n. 1 (1858).

♂. "Solun, in October; taken there also in July, and at Mhow in October."—*C. S.*

67. Agrotis suffusa.

Noctua suffusa, Denis, Wien. Verz. p. 80, n. 4.

"Solun, in June; have taken it here (Mhow) also in February, and at Quetta in September."—*C. S.*

68. Agrotis aristifera.

Agrotis aristifera, Guénée, Noct. i. p. 266, n. 426 (1852).

Agrotis munda, Walker, Cat. Lep. Het. x. p. 348, n. 99 (1856).

"Solun; took it also at Kurrachee in February, and at Mhow in November, December, and March."—*C. S.*

69. Agrotis fraterna.

Agrotis fraterna, Moore, Descr. Ind. Lep. Ins. coll. Atkinson, p. 116 (1882).

Solun, in June; Nilgherries.

The two examples sent by Colonel Swinhoe differ not a little in the coloration of the primaries, and were consequently numbered differently by him; the specimen from the Nilgherries has the primaries of a uniform grey tint, and might be supposed to represent a local race; but a note following the locality states that it also comes from Solun; the example from the latter locality in the present collection has the whole central area of the primaries dark brown: such variations in the ground-colour of the wings are common in *Agrotis*.

70. Spælotis fragilis, sp. n.

Resembles *Caradrina arenacea* in colouring; is allied to *Spælotis decora*, but smaller and with very ill-defined markings. Primaries sericeous brownish grey, irrorated with dark grey; orbicular spot obsolete; reniform spot represented by a narrow 3-shaped whitish marking; the two ordinary blackish lines indistinct, formed as in *S. latitans* of Europe, but the denticulation of the outer line ill-defined; a marginal series of black points; fringe traversed by dark grey stripes: secondaries sericeous white, slightly pearly, very slightly greyish at external margin, with a series of ill-defined darker points; fringe greyish excepting at the base; thorax grey, abdomen whitish. Under surface shining greyish white; wings with a marginal series of black points; primaries with a blackish subcostal spot halfway between the cell and apex; venter and upper surface of legs grey. Expanse of wings 32 mm.

Solun, in June.

71. Epilecta semiherbida.

Triphæna semiherbida, Walker, Cat. Lep. Het. xi. p. 743 (1857).

The clue to the locality of this example is lost; we, however, have it in the Museum from Darjiling.

72. Epilecta opulenta.

Epilecta opulenta, Moore, MS.

Nilgherries.

The example is imperfect, the wings being broken and the abdomen and antennæ wanting. The species is in Mr. Hocking's collection.

73. GRAPHIPHORA C-NIGRUM.

Phalæna-Noctua c-nigrum, Linnæus, Fauna Suecica, p. 1193.

Solun, in July.

"Ground-colour much darker than any Nilgherry examples of *Graphiphora c-nigrum*. I have also one from Suttara taken in November, primaries quite as dark, secondaries almost as dark as primaries."—*C. S.*

The species varies a good deal in depth of colour.

74. ORTHOSIA EXTERNA.

Orthosia externa, Walker, Cat. Lep. Het., Suppl. iii. p. 715 (1865).

No locality given; the type was from Darjiling.

75. EUPLEXIA SEMIFASCIA.

Hadena semifascia, Walker, Cat. Lep. Het., Suppl. iii. p. 737 (1865).

Nilgherries.

76. HADENA SIDERIFERA.

Hadena siderifera, Moore, P. Z. S. 1881, p. 357.

"Solun, in June; common there; I have it also from the Nilgherries."—*C. S.*

77. ALARIA LANCEOLATA.

Alaria lanceolata, Walker, Cat. Lep. Het., Suppl. iii. p. 767 (1865).

Mhow, September 1881.

78. ADISURA LEUCANIOIDES.

Adisura leucanioides, Moore, P. Z. S. 1881, p. 368.

"Mhow, October 1881; also took two specimens of this at Puggur Pir near Kurrachee in August 1879."—*C. S.*

The type was from Kutch, from which locality we have specimens in the Museum collection.

79. HELIOTHIS ARMIGERA.

Noctua armigera, Hübner, Noct. pl. 79. fig. 370 (1805-24).

Solun, in June; Kurrachee, in January 1880.

80. HELIOTHIS RUBRESCENS?

Thalpophila rubrescens, Walker, Cat. Lep. Het. xv. p. 1681 (1858).

Solun, in July.

It is doubtful whether this is more than a dark reddish variety of

H. armigera. The original description was taken from a specimen collected at Moreton Bay; in New Zealand it is a common form; and in both these localities it is redder than specimens coming from India or Africa. The specimen before me would perhaps be more correctly placed as a dark form of *H. conferta.* Respecting this and the preceding species, Colonel Swinhoe says:—"Three varieties of *Heliothis armigera*: has each a specific name? All these kinds have been captured by me in Sind, Afghanistan, and Central India; I have also single examples of two other varieties."

–81. ANTHÆCIA SWINHOEI, sp. n.

Primaries above laky-brown, shining reddish cupreous in some lights, speckled with blackish, crossed in the middle by a slightly irregular and rather narrow blackish band; apex bordered with blackish; costa spotted with blackish: secondaries bright ochre-yellow, with a rather broad black external border; fringe golden; a slender curved grey line across the centre of the ochreous area: thorax reddish; abdomen blackish, the segments edged with ochraceous. Primaries below blackish with faint lake-red reflections; a large spot at the end of the cell and a submarginal stripe black, but only visible in certain lights; costa and fringe golden ochraceous; secondaries ochreous, grey-speckled; external border greyish, tinted with reddish at apex, bounded internally by two imperfect parallel blackish stripes, a third across the ochreous area as above, but better defined: body below pale golden, sericeous; tarsi banded with grey. Expanse of wings 26 mm.

Assirghur, October 1881.

This is a very distinct and beautiful little species.

– 82. ERIOPUS LATREILLII.

Eriopus latreillii, Duponchel, Suppl. Lép. France, iv. p. 327, pl. 123. fig. 2.

Solun, in June.

This species, being structurally distinct from the other forms hitherto associated with it under *Callopistria,* Hübner, may be regarded henceforth as the type of Treitschke's genus *Eriopus,* under which it stood as *Eriopus quieta.*

—83. PLUSIA NIGRISIGNA.

Plusia nigrisigna, Walker, Cat. Lep. Het. xii. p. 928, n. 87 (1857).

"Kasauli, in September; I have it also from Umballa, and one very dark example from Solun."—*C. S.*

– 84. PENICILLARIA DELATRIX.

Penicillaria delatrix, Guénée, Noct. ii. p. 304, n. 1112 (1852).

Clue to exact locality missing. The Museum examples are all from Java.

85. Cosmophila xanthindyma.

♂. *Cosmophila xanthindyma*, Boisduval, Faune de Madag. pl. 13. fig. 7 (1833).

♀. *Cosmophila indica*, Guénée, Noct. ii. p. 396, n. 1256 (1852).

"♂, Solun; ♀, common at Mhow during September."—*C. S.*

Of the male Colonel Swinhoe says, "also taken at Mhow in October."

86. Gonitis mesogona.

Gonitis mesogona, Walker, Cat. Lep. Het. xiii. p. 1002, n. 10 (1857).

Solun, in July.

87. Gonitis involuta.

Gonitis involuta, Walker, Cat. Lep. Het. xiii. p. 1003, n. 12 (1857).

"Nilgherries; also taken at Kurrachee in June."—*C. S.*

88. Polydesma laudula.

Polydesma laudula, Guénée, Noct. ii. p. 441, n. 1313 (1852).

"Depalpur, November 1881; taken also at Mhow in September."—*C. S.*

89. Lophoptera costata.

Lophoptera costata, Moore, MS.

"Dharmsala, in August."—*C. S.*

This species is in Mr. Hocking's collection; the specimen sent by Colonel Swinhoe has lost its abdomen and antennæ.

90. Gyrtona chalybea, sp. n.

Primaries smoky grey with steel-blue reflections, spotted and striated with blackish; a spot on the reniform marking (which is outlined in black) and two parallel discal series of subconfluent spots golden cupreous; a brown submarginal stripe and a marginal series of black dashes; fringe whitish, traversed by two slender blackish lines: secondaries with the basal half opaline, hyaline white, with black veins; external half dark brown; fringe pure white, traversed by a blackish stripe: thorax blackish; abdomen smoky grey. Wings below opaline white, veins blackish; a broad external dark-brown border; costal area of primaries blackish; four white dots on the costal margin beyond the cell; body below white; legs greyish above. Expanse of wings 33 mm.

"Solun, in September; also taken there in August."—*C. S.*

Although Walker places this genus in the Phycidæ, it differs but little from *Steiria*.

91. ODONTODES ALEUCA.

Odontodes aleuca, Guénée, Noct. iii. p. 51, n. 1382 (1852).

Var. *Briarda bolinoides*, Walker, Cat. Lep. Het. xv. p. 1802 (1858).

Solun, in July.

92. HYPOCALA ASPERSA, sp. n.

Primaries above as in *H. plumicornis* of South Africa, leaden grey clouded with olivaceous, this colour, however, being principally confined to a belt before the middle, mottled with chocolate and creamy yellow, especially towards the costa ; the reniform spot outlined in chocolate ; external border sericeous lilacine, bounded internally by a red-brown and cream-coloured angulated line: secondaries as in *H. subsatura*, black, with a large spot at the end of the cell, two unequal spots on the outer margin, and a looped internal stripe from base ochreous; fringe greyish white towards apex, ochreous towards anal angle, and brown towards base of abdominal margin: thorax greyish brown; abdomen black, greyish-brown at base, banded with pale ochreous. Under surface pale creamy ochreous, with black markings as in *H. subsatura*, but those of the secondaries narrower. Expanse of wings 44 mm.

Solun, in June.

93. PHYLLODES ROSEIGERA, sp. n.

Nearly allied to *P. consobrina*, but the reniform marking on the primaries less sigmoidal, more nearly as in *P. inspicillator*; the blotch of rose-colour at anal angle of secondaries narrower and more elongated, consequently less orbicular in shape; sometimes faintly clouded or streaked with white, but never with the large central white patch of *P. consobrina*. Expanse of wings 142 mm.

Andamans, in July.

I have seen a considerable number of examples of this species.

94. SYPNA PUNCTOSA.

Tavia punctosa, Walker, Cat. Lep. Het., Suppl. iii. p. 939 (1865).

"Solun, in May ; very common there during that month."—*C. S.*

95. SYPNA CYANIVITTA.

Sypna cyanivitta, Moore, P. Z. S. 1867, p. 70.

"Solun, in June ; very common there during that month."—*C. S.*

96. OPHIODES TRIPHÆNOIDES.

Ophiodes triphænoides, Walker, Cat. Lep. Het. xiv. p. 1358, n. 11 (1857).

The locality wanting ; we have it from the Punjab.

97. OPHIODES FERVIDA, sp. n.

Allied to *O. lunaris* of Europe, but darker and redder than *O. cuprea* ; smaller than either. Primaries brownish flesh-colour, sparsely black-speckled, crossed in the middle by two indistinct widely divergent pale lines, the inner one abruptly angulated towards the inner margin; reniform oblique, its upper half blackish as in *O. hottentota, separans*, &c. (of the *O. vesta* group); a costal black spot halfway between it and the external area, which is zigzag internally as in *O. lunaris* (but not *cuprea*), and bounded internally by a continuous black stripe unlike any species known to me: secondaries mouse-brown, with the entire disk from before the middle of the wing to near the outer margin covered by a diffused black nebula: body pale brown. Under surface pale sandy brown; all the wings crossed by an ill-defined grey discal band. Expanse of wings 47 mm.

Solun, in July.

98. OPHIODES CUPREA.

Ophiodes cuprea, Moore, P. Z. S. 1867, p. 74.

Locality missing; we have it from Formosa.

× 99. PANDESMA ANYSA.

Pandesma anysa, Guénée, Noct. ii. p. 439, n. 1311 (1852).

Locality not recorded.

100. OPHIUSA ACHATINA.

Phalæna achatina, Sulzer, Ins. pl. xxii. fig. 4.

"Dugshai; I have it also from Suttara, taken in September."—*C. S.*

101. OPHIUSA ARCTOTÆNIA.

Ophiusa arctotænia, Guénée, Noct. iii. p. 272, n. 1711 (1852).

"Solun, in June; dark and less broadly marked with white than my examples of *Ophiusa achatina* from Kurrachee, Mahableshwur and Umballa."—*C.S.*

× 102. GIRPA OPTATIVA.

Remigia optativa, Walker, Cat. Lep. Het. xiv. p. 1510, n. 22 (1857).

Locality wanting.

Colonel Swinhoe says that he has this species from the Nilgherries.

103. BYTURNA DIGRAMMA.

Bocana digramma, Walker, Cat. Lep. Het., Suppl. iv. p. 1170 (1865).

Mhow, in September 1881.

"Also taken at Kurrachee in June."

This is evidently a variable species: the two characteristic black costal spots are wanting in the type. A specimen, in poor condition, of what may prove to be only another variety was taken by Colonel Swinhoe at Mhow in September; it differs from the more typical example in the clearer colour of its wings, upon which the black costal spots are the only markings to be seen: this form he says was "also taken at Assirghur in October."

104. Aphandala misera, sp. n.

Cinereous; primaries above with a narrow black reniform marking; two or three irregular brown basal transverse lines; a central undulated oblique line, interrupted by the reniform marking; an irregularly undulated whitish discal line broadly bordered with golden brown; a marginal series of black dots; fringe greyish brown, with a whitish basal line: secondaries paler than the primaries, excepting on the external area, which is partly bounded internally by an abbreviated diffused brownish stripe from the abdominal margin; fringe as in primaries: abdomen rather paler than the thorax. Primaries below grey, sericeous, with whitish inner border; secondaries whitish, grey-speckled, and traversed beyond the middle by two ill-defined irregular grey stripes; body below whity brown. Expanse of wings 21 mm.

From four examples, all more or less rubbed, taken at Assirghur in October 1881; it occurs also at Mhow in the same month.

A second species, apparently referable to *Aphandala*, and taken at Mhow in September, is represented by a single broken example, the body of which has been somewhat crushed so as to render its identification uncertain. A third form, possibly referable to Walker's genus *Cataba* or the old genus *Rivula*, has lost its palpi and therefore cannot be described; it was obtained at Kurrachee in January 1880. A fourth form, belonging to the same group of genera, is rubbed beyond all possibility of recognition; it was taken at Mhow in September 1881.

I note the above to show, in the first place, that the Lepidoptera of Mhow and Kurrachee are as yet far from being exhausted, and, in the second place, to induce collectors of the smaller forms to pay especial attention to the perfect condition of the specimens which they send home: the absence or distortion of the palpi frequently renders the proper allocation of Lepidoptera a hopeless task.

105. Bleptina morosa.

Bleptina morosa, Butler, Ill. Typ. Lep. Het. iii. p. 64, pl. lvi. fig. 15 (1879).

Solun.

PYRALES.

106. Pyralis elachia.

Pyralis elachia, Butler, Ill. Typ. Lep. Het. iii. p. 70, pl. lviii. fig. 3 (1879).

Solun.

107. Pyralis platymitris, sp. n.

Primaries above very like those of *P. elachia*, but the dark areas of a more chocolate colour, and the central belt of a sordid sandy whitish tint; the inner edge of this belt is angulated somewhat as in *P. farinalis*; the outer edge, however, is nearly straight, and the external brown area consequently broader: secondaries altogether darker than in either species, the base, central belt, and external area being only slightly paler than on the primaries. Expanse of wings 24 mm.

Solun.

108. PYRALIS LUCILLALIS.

Pyralis lucillalis, Walker, Cat. Lep. Het. xvii. p. 268, n. 21 (1859).

Solun.

The type of this species was from China.

109. APORODES MELEAGRISALIS.

Herbula meleagrisalis, Walker, Cat. Lep. Het. xvii. p. 324, n. 11 (1859).

"Kurrachee, March 1880; taken there in February, March, and April; at Lachana, Sind, in July; at Kotree, Upper Sind, in March; Quetta in January and March; Metazai, South Afghanistan, in May: plentiful."—*C. S.*

110. SAMEA INSCITALIS.

Ædiodes inscitalis, Walker, Cat. Lep. Het., Suppl. iv. p. 1297 (1865).

Mhow, September 1881.

This species is nearly allied to *S. ecclesialis* of Guénée.

111. SALBIA? PERSPICUALIS.

Zebronia perspicualis, Walker, Cat. Lep. Het., Suppl. iv. p. 1347 (1865).

Botys? flexissimalis, Walker, *l. c.* p. 1426 (1865).

Mhow, October 1881.

This form agrees better with *Salbia* than with *Zebronia*.

112. PARAPONYX AFFINIALIS.

Paraponyx affinialis, Guénée, Delt. et Pyral. p. 270, n. 259 (1854).

Mhow, October 1881.

113. HYDROCAMPA TENERA, sp. n.

Allied to *H. rivulalis*, much smaller. Snow-white, with brown markings as follows:—primaries with two brown lines across the base, followed by an oblique abbreviated costal line; two irregular oblique parallel lines before the middle, united towards their inferior extremities to two more slender parallel angulated lines, which commence in a pale quadrate patch enclosing a black spot at the end of the cell; a third pair of lines near the external border, their upper portion running obliquely from the costa to the external border near the external angle, which they then bound to inner margin; external border bounded internally by a brown line excavated in the middle, and brownish at apex and external angle: secondaries with a tapering brown fascia across the end of the cell and two parallel lines, the outer of which limits the external border, the latter brown, slightly paler than the lines: abdomen spotted with sandy brownish. Wings below with markings rather paler than above; body white. Expanse of wings 13 mm.

"Mulleer river near Kurrachee, November 1879; also one taken at Kurrachee in January and one in May."—*C. S.*

114. BOTYS ILUSALIS.

Botys ilusalis, Walker, Cat. Lep. Het. xviii. p. 705, n. 277 (1859).

Solun, in August.

115. BOTYS AUREA?

Botys aurea, Butler, Ill. Typ. Lep. Het. iii. p. 76, pl. lix. fig. 11 (1879).

"Mhow, October 1881: scarce, the only one taken here; I have it also from Solun taken in July."—*C. S.*

116. BOTYS SIGNATALIS.

Botys signatalis, Walker, Cat. Lep. Het., Suppl. iv. p. 1444 (1865).

Solun.

117. BOTYS ABSTRUSALIS.

Botys abstrusalis, Walker, Cat. Lep. Het. xviii. p. 663, n. 204 (1859).

"Mhow, September and October 1881; taken here also in November, and at Kurrachee in April and November."—*C. S.*

118. EBULEA CATALAUNALIS.

Botys catalaunalis, Duponchel, Lép. de France, viii. p. 330, pl. 232. fig. 8.

Botys venosalis, Walker, Cat. Lep. Het., Suppl. iv. p. 1401 (1865).

"Mhow, October 1881; also taken at Kurrachee in May."—*C. S.*

119. NYMPHULA INTERPUNCTALIS?

Pyralis interpunctalis, Hübner, Pyral. ii. pl. 19. fig. 128.

"Muggur Pir, August 1879; Kurrachee, May 1880; also taken at Kurrachee and at Larkana in the month of July."—*C. S.*

This seems to be the European species; but the two examples sent by Colonel Swinhoe are somewhat rubbed.

120. GODARA INCOMALIS.

Pionea incomalis, Guénée, Delt. et Pyral. p. 369, n. 454 (1854).

"Kurrachee, May 1879; also taken there in April."—*C. S.*

GEOMETRITES.

121. CELERENA ANDAMANA.

Celerena andamana, Felder and Rogenhofer, Reise der Novara, Lep. iv. pl. cxxx. fig. 18 (1875).

♂. South Andamans, July 1880.

"I have it also from Upper Tenasserim, taken in August."—*C. S.*

122. NYCTALEMON NAJABULA.

Nyctalemon najabula, Moore, P. Z. S. 1877, p. 620.

♂ ♀. South Andamans, August 1880.

123. HYPERYTHRA SWINHOEI.

♂. *Hyperythra swinhoei*, Butler, Ann. & Mag. Nat. Hist. ser. 5, vol. v. p. 223 (1880); P. Z. S. 1881, p. 614, n. 61.

♀. "Mhow, February 1882; taken also at Depalpore late in November; there are two examples in my collection from Solun, month not marked, and one from Umballa taken in April

"Corresponds with my Kurrachee examples of *Hyperythra phantasma*, named by you in P. Z. S. May 1881, p. 615, except as to shade of ground-colour of wings; but one of the Solun examples is identically the same as the Kurrachee ones."—*C. S.*

The example sent is of a brownish flesh-tint; it is darker and more strongly marked than the males hitherto received; it has the characteristic subapical black spots on the secondaries strongly defined; in *H. phantasma*, an almost white species, of which I only know the female, these spots are entirely absent. A male (in the Museum collection) appears to me to be unquestionably a dark form of *H. swinhoei*; it is of the same colour as the female now sent; and was taken by my sister, Dr. F. Butler, at Jubbulpore.

124. NEMORIA CARNIFRONS, sp. n.

Pale opaque emerald-green; wings crossed beyond the middle by a straight white stripe; fringe whitish; primaries with the costa white; vertex of head pale buff; frons reddish brown; collar and shoulders white, thorax and tegulæ green; abdomen white: wings below paler than above; body below white; anterior coxæ and femora reddish. Expanse of wings 24 mm.

"Mhow, in September 1881, common here during that month. I have also specimens from Solun taken in June."—*C. S.*

125. NEMORIA PRUINOSA.

Nemoria pruinosa, Butler, Ann. & Mag. Nat. Hist. ser 5, vol. v. p. 224, n. 19 (1880); P. Z. S. 1881, p. 616, n. 64.

"Kurrachee, September 1879; one taken there in May, and three in December."—*C. S.*

126. THALASSODES, sp.

Probably a new species, but not in sufficiently good condition for description.

"Mhow, September 1831; not common here."—*C. S.*

127. EPHYRA DHARMSALÆ, sp. n.

Deep flesh-reddish; wings deeper reddish towards external border; a central irregular rather narrow greyish band with slightly darker borders; basal third of primaries traversed by five parallel ill-defined reddish lines; the central band on these wings marked with two slightly darker spots, one subcostal, the other on the second median interspace; costal border slightly paler than the rest of the ground-colour, unspotted: under surface pale flesh-tinted, with minute dusky discocellular dots. Expanse of wings 30 mm.

Dharmsala.

128. EPHYRA CLEORARIA.

Acidalia cleoraria, Walker, Cat. Lep. Het. xxiii. p. 792, n. 275 (1861).

"Mhow, October 1881 and February 1882; also taken here in March, at Depalpore in November, and at Assirghur in October; I have also one example from Solun."—*C. S.*

129. IDÆA INVALIDA?

Acidalia invalida, Butler, Ann. & Mag. Nat. Hist. ser 5, vol. iv. p. 439, n. 75 (1879).

"Kurrachee, December 1879: one also taken there in May: it is scarce."—*C. S.*

The example sent to me is in bad condition, but it appears to be the same as the Japanese species.

130. IDÆA NEGATARIA.

Acidalia negataria, Walker, Cat. Lep. Het. xxii. p. 751, n. 193 (1861).

"Depalpore, November 1881; only one taken there, and one also taken at Mhow in October."—*C. S.*

131. IDÆA ABSCONDITARIA.

Acidalia absconditaria, Walker, Cat. Lep. Het. xxiii. p. 757, n. 203 (1861).

"Mhow, October and December 1881; also taken here in November, but is not common."—*C. S.*

132. IDÆA WALKERI.

Acidalia extimaria, Walker, Cat. Lep. Het. xxiii. p. 794, n. 280 (nec 252) (1861).

"Mhow, January 1882; one other taken in October."—*C. S.*

133. IDÆA INDUCTATA.

Acidalia inductata, Walker, Cat. Lep. Het. xxiii. p. 792, n. 276 (1861).

"Kurrachee, February and December 1879; taken there occasionally in May, November, and December, but not common."—*C. S.*

The specimens were separated under two numbers by the collector.

134. HYRIA BILINEATA, sp. n.

Ochreous; wings sericeous, sparsely striated with ferruginous; a nearly straight line, from costa of primaries to abdominal margin of secondaries, a little before the middle, and an irregular submarginal stripe, zigzag on the primaries, greyish ferruginous; external border rather densely irrorated with ferruginous: costal margin of primaries reddish; head reddish: under surface pale creamy ochreous; wings with the costal borders to the end of the discoïdal cells darker: dark-brown discocellular dots; the straight line of the upper surface indistinctly visible through the wings; a rather broad greyish-brown external border. Expanse of wings 17 mm.

"Assirghur, October 1881: common there during October."—*C. S.*

—135. EROSIA THECLATA.

Erosia theclata, Guénée, Phal. ii. p. 36, n. 951 (1857).

Erosia adjutaria, Walker, Cat. Lep. Het. xxiii. p. 849, n. 34 (1861).

Solun, in August.

—136. MACARIA PEREMPTARIA.

Macaria peremptaria, Walker, Cat. Lep. Het. xxiii. p. 929, n. 111 (1861).

"Mhow, October 1881; also taken at Kurrachee in November and December; a scarce *Macaria* there, as it is here, the one I am sending you being the only one secured here."—*C. S.*

—137. TEPHRINA GRANITALIS, sp. n.

Greyish white, densely irrorated with smoky-grey striæ; the body very dark; a spot at the end of each cell and the external borders of the wings dark grey; these borders are rather broad and have a regular straight inner edge; the secondaries are much less densely striated than the primaries, and therefore appear to be whiter: under surface white, sparsely striated with grey; wings with discocellular spots and external border grey, the latter partly interrupted by white streaks through their lower half. Expanse of wings 30 mm.

"Mhow, September 1881; another scarce *Macaria*, only two having been taken."—*C. S.*

—138. TEPHRINA LITHINA, sp. n.

Pale sandy stone-colour; wings sparsely striated with dark brown; a brown discocellular spot with black-and-white centre on each wing; a disco-submarginal brown band, wider and darker on the secondaries than on the primaries, and a marginal series of imperfect brown dots: wings below with the markings decidedly redder and more distinct than above. Expanse of wings 28 mm.

"Kurrachee, July 1879; I have this also from Solun and from Umballa, taken in March."—*C. S.*

139. TEPHRINA ZEBRINA, sp. n.[1]

Allied to *T. strenuata* from the Punjaub; similar in form to

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[1] Felder and Rogenhofer refer species of this group to *Fidonia*; but I doubt the possibility of separating them structurally from *Tephrina*.

T. lithina, and having similar markings; the wings, however, paler, the discal band on the primaries edged internally by a black angulated stripe, close to the centre of which also is a black spot; two other black stripes cross the same wings, the three being at equal distances apart; the secondaries are crossed by a grey-blackish stripe at the basal third, and the disco-submarginal band is partly bounded internally by a black stripe, near the extremity of which it bears a small black spot: on the under surface the pattern is similar to that of *T. lithina*, but the markings are bronze-brown. Expanse of wings 26 mm.

"Mhow, March 1882. Is this another form of the variable *Macaria strenuataria* of Walker?"—*C. S.*

The species is nearer to Walker's "*Macaria*"! *strenuata* than to his *M. strenuataria*; it is probable, from the similarity in the two names, that these nearly allied forms have got confounded in Colonel Swinhoe's collection, and have thus led him to regard the species as variable.

—140. NADAGARA[1] GRISEA, sp. n.

Pearl-grey; primaries crossed by two widely separated dark-brown lines, the inner one straight, the outer one strongly angulated above the middle and inarched on each side of the angle; a slender brown marginal line: secondaries crossed just beyond the middle by a slightly angulated but nearly straight dusky line; a slender marginal line. Primaries below pearl-grey; the costal area pale yellow, speckled with grey and crossed towards apex by a brownish line; a slender black marginal line; fringe dark grey with a pale yellow basal line; secondaries pale creamy yellow, grey-speckled; a nearly rectangular dark-brown line across the disk; a slender marginal black line; fringe pale yellow. Expanse of wings 32 mm.

Exact locality wanting.

DELOCHARIS, gen. nov.

Aspect of *Idæa* (*I. aversata*), but allied to *Coremia*. Primaries elongated, acuminate, but not falcate; secondaries comparatively short, pyriform; discoidal cells not extending to the middle of the wings; costal vein of primaries extending to second third of costal margin; subcostal five-branched—first branch emitted at some distance before the end of the cell, united beyond the cell by a short cross vein to the second, the three following branches (including the second) branching off at regular intervals, the third and fourth forming a long fork to apex, the fifth branch emitted from below the vein in a line with the cross veinlet; radials normal, the upper radial from the anterior angle of the cell; discocellulars transverse, very slightly inarched; second and third median branches emitted near together from the posterior angle of the cell; costal and subcostal veins of secondaries closely approximated at their origins;

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[1] The position of this genus is at present undecided; it probably should be near to *Drepanodes*.

subcostal branches forking from a long footstalk; discocellulars oblique; median branches as in primaries. Palpi erect, not reaching to a level with the top of the head; eyes large and prominent; antennæ long, simple; abdomen moderately robust and rather short, not reaching to the anal angles of the secondaries; legs long, moderately slender.

141. DELOCHARIS HERBICOLENS, sp. n.

Pinky whitish; wings with the basal third slightly brownish; a black dot at the end of each discoidal cell; a nearly straight red-brown discal band with darker edges, and a brownish external border limited internally by a darker undulated line; these bands are less defined on the secondaries than on the primaries; on the under surface they are paler on all the wings. Expanse of wings 33 mm.

"Solun, common in grass; but the month unfortunately is not recorded."—*C. S.*

142. COREMIA, sp.

A broken and headless specimen of a species near to *C. ferrugata* of Europe.

No exact locality recorded.

The Phycidæ of the collection were submitted to M. Ragonot for examination; but he pronounced them to be too much worn for determination, in which verdict I perfectly agree with him.

CRAMBITES.

143. JARTHEZA CHRYSOGRAPHELLA.

Chilo chrysographellus, Kollar, Hügel's Kaschmir, p. 494 (1848).

"Mhow, February 1882; taken here also in March and November."—*C. S.*

144. CRAMBUS TODARIUS, sp. n.

Shining snow-white; primaries with a longitudinal diffused golden-brown streak below the cell; secondaries slightly sordid at apex: primaries below smoky brown with shining white borders; secondaries shining white, with the veins towards costa brown. Expanse of wings 23 mm.

Neilgherries.

TORTRICITES.

145. CACOËCIA MICACEANA?

Cacoecia micaceana, Walker, Cat. Lep. Het. xxviii. p. 314, n. 21 (1863).

Solun.

146. PÆDISCA DECOLORANA?

Pædisca decolorana, Freyer, Neuere Beiträge, 318, 5 (1831–58).

Kurrachee, May 1879.

Our European example of this species is rubbed; and the specimen before me is distorted through the rusting of the pin; the general tint, and the pattern where I am able to compare it, agrees, as also the structure.

TINEITES.

147. TEGNA HYBLÆELLA.

Tegna hyblæella, Walker, Cat. Lep. Het., Suppl. v. p. 1810 (1866).

"Mhow, September 1881; scarce."—*C. S.*

148. GELECHIA, sp.

A black species, apparently nearest to *G. infernalis* of Europe, but too much broken (only half a palpus remains, and no antennæ) to be described.

"Mhow, October 1881; common for about a week."—*C. S.*

It is a pity that only a single injured example was sent; without palpi, it is not even certain that the species is a *Gelechia*, though I have very little doubt that it is.

149. DEPRESSARIA SWINHOEI, sp. n.

Allied to *D. culcitella*. Stramineous; the primaries with two black dots placed longitudinally and slightly obliquely, in and at the end of the discoidal cell; a curved marginal series of dusky dots; secondaries with the basi-abdominal half whitish; wings below without markings. Expanse of wings 16 mm.

Mhow, October 1881.

150. YPSOLOPHUS ROBUSTUS, sp. n.

Thorax and primaries pale ash-grey, the latter with two small elongated blackish spots, one in the cell before the middle of the wing, the other below the extremity of the cell; a marginal series of dusky dots; secondaries and abdomen whitish; the long tapering fringe of the palpi black, tipped in front with white: primaries below fuliginous brown; secondaries and body white. Expanse of wings 17 mm.

"Kurrachee, September 1879; one taken there in each of the months of February, September, November, and December."—*C. S.*

The remainder of the Microlepidoptera are too much broken to be determined.

In a collection, the account of which I published last year (Ann. & Mag. Nat. Hist. ser. 5, vol. ix. pp. 206–211), I indicated an imperfect female *Hipparchia* as possibly *H. anthe*; the male of *Epinephele roxane* was in the same collection. Major Marshall (P. Z. S. 1882) states that the "specimens" identified as *H. anthe* have been sent to him by Col. Swinhoe and prove to be females of *Epinephele roxane*. As I know both sexes of the latter, and am not likely to regard a rubbed specimen as belonging to another genus, it is clear that Col. Swinhoe, through press of official business, has made a mistake in labelling his specimens; indeed this is *evident* from the fact that *more than one* specimen was sent to Major Marshall.

DESCRIPTION OF PLATE XXIV.

Fig. 1. *Ypthima rara* (under surface), p. 145.
2. *Catochrysops hapalina*, ♂ (upper surface), p. 148.
3. —— ——, ♀ (upper and under surface).
4. *Teracolus intermissus* (upper and under surface), p. 152.
5. *Neptis eurymene* (upper and under surface), p. 145.
6. *Ixias depalpura*, ♂ (upper and under surface), p. 153.
7. —— ——, ♀. " "
8. *Hypanis simplex* (upper and under surface), p. 146.
9. *Neptis swinhoei* (upper and under surface), p. 145.
10. *Aphnæus bracteatus*, ♀ (under surface), p. 147.
11. —— ——, ♂ (upper surface).
12. *Surendra biplagiata* (upper surface), p. 147.
13. *Terias asphodelus*, ♂ (upper and under surface), p. 151.

2. Notes on the Zebra met with by the "Speke and Grant" Expedition in Eastern Africa. By Col. J. A. Grant, F.R.S., F.Z.S.

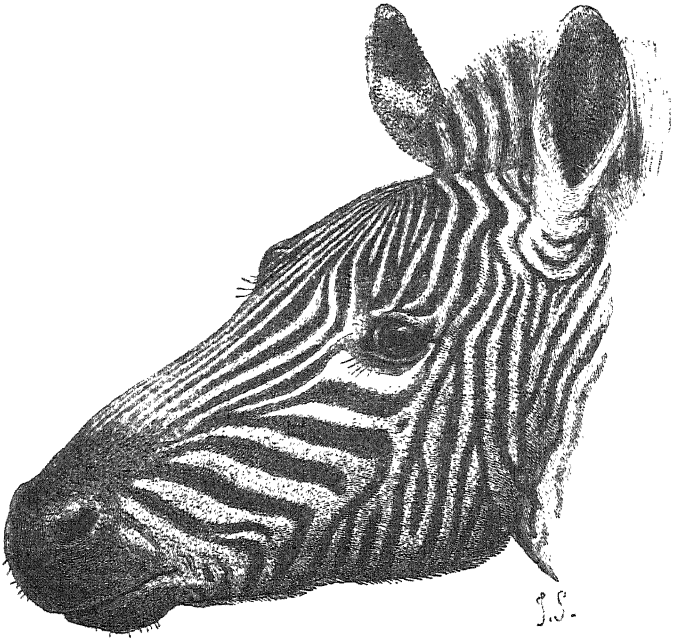
[Received March 22, 1883.]

The question as to what Zebras are met with in various parts of Eastern Africa having been started at a former Meeting by Mr. Sclater's remarks on the so-called *Equus grevyi* of Shoa, I wish to state that, during our expedition of 1860–63, the late Capt. Speke and I found but one species of Zebra along our route. As regards this animal I am able, through the kindness of Mr. W. Speke, the brother of my late companion, to place before the Meeting the head (see woodcut, p. 176), leg, and tail of one of the Zebras shot during our journey. I have repeatedly examined the Burchell's Zebra living in the Society's Gardens, and found the stripes broad, the general colour more like that of the Wild Donkey of Thibet, the legs to have few or no stripes, and the animal not wellbred-looking; whereas Speke's Zebra, as seen in its wild state and from the specimen before us, has narrow stripes of black covering every inch of its body, head, and legs down to the hoofs, distinctly marked, as if by a tar-brush on a white sheet; the muzzle is black (like the photograph of *E. grevyi*). In a sketch made by me in Africa of an old mare which I had shot, the mane stands erect, the tail is barred as far down as the long hairs, which are fuller in this animal than in either the donkey or the mule. This Zebra is not Burchell's Zebra in my opinion.

I saw this Zebra in herds which varied in numbers from two to nine; and if I add up all the animals seen on the fifteen occasions of *my* meeting with them, we shall have seventy-five animals. Eight of these I shot; two were shot by one of our Cape Mounted Riflemen; and Speke shot two not included in the above. In all we killed nine horses and three mares, leaving a sufficient stock of sixty-five; but if we consider the wide range they must occupy, we did not meet with a fiftieth part of the number then in existence, probably two to three thousand.

We were unable to take its correct height; but when it stood beside the full-sized Sable Antelope, this Zebra was one hand lower. Probably by measuring Speke's head some approximate idea of its height would be obtained.

The proportions of the body are symmetrical, the cannon bone short, the body well-ribbed up like a cob, ears short, legs clean, and hoofs perfect in form. Those which we observed were swift walkers, picking up food fast as they went along, fair trotters, and when cantering and galloping their action was perfectly beautiful. Of course we only saw those that were in good condition and healthy; the more weakly and old no doubt easily fall a prey to numberless Lions, or they may be trapped or speared by natives and shot by travellers. Still I do not think we need in our day despair of having these animals in our Gardens in the Regent's Park.



Head of Zebra obtained during the Speke and Grant Expedition.

During our march it was difficult to keep our men provisioned and from craving for meat; and to all of us the sight of a *large* quarry literally made every one rejoice; but though the meat of the Zebra is as good in appearance as the finest beef in our markets, it is horsy in flavour, and requires some relish to make it palatable. The meat was generally cut into long strips, which were dried to hardness in the sun, and eaten after being frizzled in the fire.

We had not many opportunities of observing the habits of these animals, as they are so wary. One of their number, probably the largest male, takes general charge of the herd; and it was once noticed that a large Antelope kept watch and gave the alarm on our appearance. They are rarely found outside the forest, preferring it to the open plain, which is generally bare of grass; or they frequent a country with clumps of dense brushwood or with outbursts of granite, around which they get abundant food; and they were never seen far from running water and hills.

Their breeding-season was determined by foals following their mothers in the month of January, and by the shrill calls we heard, which came, I presume, from the foals. The first time I heard their call I mistook it for that of a bird, and could scarcely be persuaded till I heard the decided donkey notes following the shriller sounds. They showed much sympathy when a comrade was wounded, lingering with the wounded at the risk of ther lives; they mingled with our laden donkeys one day on the march. And the precautions taken by the leader of the flock of his charge have already been noticed.

We saw that this animal occupies a wide range of country, from the east of the east-coast range of mountains to the north of Lake Nyanza in 0° 52′ N. lat., and conclude that, in ground favourable for breeding, it may be found continuously up to Shoa in 10° N. lat., whence the specimen in the Jardin des Plantes was brought. All this range, however, is not favourable, much of it being mountainous, some being desert and void of water; but altitude does not seem to make material difference. The animal was shot by our party at altitudes ranging from 200 feet above sea-level to three and four thousand feet high, on elevated plateaux covered with forest; at the head-waters of the Mgæta river, which flows into the Kingani, debouching on the east coast, we shot it; across the east-coast range, near the head-waters of the Nile in E. Ugogo, we saw it; near the shores of Lake Nyanza, in Usui, we found it; and in Uganda, to the north of Victoria Lake, we shot it.

It therefore appears to be a hardy animal, living as it does at such varied altitudes and under such different temperatures, ranging from 70° night heat to 130° day. It may also be said of it that the disease which affects the imported mules and horses seems not to destroy it, that it was generally found wherever there is good grazing and where cattle most abound, and that it has chosen for its homes some of the brightest and most fertile spots in Equatorial Africa.

April 17, 1883.

Prof. Flower, LL.D., F.R.S., President, in the Chair.

The Secretary read the following report on the additions to the Society's Menagerie during the month of March 1883:—

The registered additions to the Society's Menagerie during the month of March were 129 in number. Of these 35 were acquired by presentation, 49 by purchase, 11 were born in the Gardens, and 34 were received on deposit. The total number of departures during the same period, by death and removals, was 120.

The following are of special interest:—

1. Three Sirens (*Siren lacertina*) from South Carolina, presented by G. E. Manigault, Esq., C.M.Z.S., March 21st.

2. An American Teetee Monkey, of the genus *Callithrix*, which it is difficult to determine satisfactorily in its living state, but which is certainly new to the Society's Collection, purchased March 31st.

The Monkey, which was obtained of Mr. Hagenbeck of Hamburg, is about 15 inches in length of body, and has a long slender tail of about the same length. Its fur is of a nearly uniform dirty white; face blackish; hands and feet black; tail pale reddish.

There is no specimen like it in the British Museum; nor can I find any description applicable to it.

3. A Madagascar Lemur, of the genus *Hapalemur* (probably *H. griseus*), purchased March 31st, also new to the Society's Collection.

The following papers were read:—

1. On the Arrangement of the Orders and Families of existing Mammalia. By William Henry Flower, LL.D., F.R.S., P.Z.S., &c.

[Received April 17, 1883.]

In the present condition of the world, Mammals have become so broken up into distinct groups by the extinction of intermediate forms, that a systematic classification is perfectly practicable. Most of the associations of species, which we call "orders," and even the "suborders" and "families," are natural groups. In isolating, defining, and naming them, we are really dealing with facts of nature, of a totally different order from the artificial and fanciful divisions formed in the infancy of zoological science. It is therefore worth while to keep their characters and limits constantly in our view, and to test their validity by every advance of knowledge.

When, however, we pass to the extinct world, all is changed. In many cases the boundaries of our groups become enlarged until they touch those of others. New forms are discovered which cannot be placed within any of the existing divisions. As the horizon of our vision is thus expanded, the principles upon which a scheme of classification is constructed must be altogether changed. Our present divisions and terminology are no longer sufficient for the purpose; and some other method will have to be invented to show the complex relationships existing between different animal forms when viewed as a whole. The present time, preeminently distinguished by the rapidly changing and advancing knowledge of extinct forms, is scarcely one in which this can be done with any satisfactory result. All attempts to form a classification embracing even the already known extinct species must be only of a very provisional and temporary nature. There are, moreover, special difficulties in undertaking this subject, to any one working on this side of the Atlantic.

It has often been remarked that the centre of gravity of the civilization, arts, literature, and commerce of the world appears to be shifting westward. This is certainly the case with palæontological discovery. Our knowledge of the ancient condition of animal life on the earth is being revolutionized by explorations in the so-called "New World." With regard to Mammals it is a curious fact, that although research has been prosecuted in suitable localities in many parts of Europe and Asia with considerable assiduity since the beginning of the century, scarcely a single form has been found which does not come within the limits of our actual ordinal groups, or which would necessitate any important modification in a classification based upon existing species. But in the New World, beginning with the earliest known South-American extinct forms—the Toxodons, Nesodons, Mesotheriums, &c., and passing to the still more wonderful discoveries of the last ten years in the Western Territories of the United States, we find ourselves in completely new realms of life. We are all at once confronted with numerous highly specialized forms, representing apparently new ordinal groups, and still more numerous generalized forms filling up the intervals, and breaking down the distinctions between nearly all the best-established orders of higher placental Mammals. With these I do not propose to deal in the present communication. The very abundance of the material that has lately come to hand is in itself an obstacle to drawing any satisfactory generalizations from it, as it has not left leisure to the few who have an opportunity of working at it to give such full and detailed descriptions as are necessary for the guidance of those who have not the advantage of examining the actual specimens.

In systematic descriptions in books, in lists, and catalogues, and in arranging collections, the objects dealt with must be placed in a single linear series. But by no means whatever can such a series be made to coincide with natural affinities. The artificial character of such an arrangement, the constant violation of all true relationships, are the more painfully evident the greater the knowledge of the real structure and affinities. But the necessity is obvious; and all that can be done is to make such an arrangement as little as possible discordant with facts. In preparing the article "Mammalia" for the ninth edition of the 'Encyclopædia Britannica,' such a scheme had to be framed; and the chief merit which I claim for it is, that it departs as little as possible from the prevailing, or what may be called traditional, sequences of arrangement. In the article, which has just appeared in the XVth volume of the 'Encyclopædia,' the groups will be found more fully defined than it is necessary to do here; but it was suggested to me by our Secretary, that it would be desirable to place before the Fellows of the Society, in a more convenient form, an abstract of the arrangement adopted, preceded by a few explanatory notes upon the mutual relations of some of the principal groups.

One of the most certain and fundamental points in the classification of the Mammalia is, that all the animals now composing the class can be grouped primarily into three natural divisions, which, presenting very marked differential characters, and having no existing, or yet certainly demonstrated extinct, intermediate or transitional forms, may be considered as subclasses of equal value, taxonomically speaking, though very different in the numbers and importance of the animals at present composing them. These three groups are often called by the names originally proposed for them by Blainville—(1) *Ornithodelphia*, (2) *Didelphia*, (3) *Monodelphia*—the first being equivalent to the order *Monotremata*, the second to the *Marsupialia*, and the third including all the remaining members of the class. Although actual palæontological proof is wanting, there is much reason to believe that each of these, as now existing, are survivors of distinct branches to which the earliest forms of Mammals have successively given rise, and for which hypothetical branches Professor Huxley has proposed the names of *Prototheria*, *Metatheria*, and *Eutheria*[1], names which, being far less open to objection than those of Blainville, are here used as equivalents of the latter.

The only known PROTOTHERIA, though agreeing in many important characters, evidently represent two very diverging stocks, perhaps as far removed as are the members of some of the accepted orders of the *Eutheria*. It would, however, be encumbering zoological science with new names to give them any other than the ordinarily known family designations of *Ornithorhynchidæ* and *Echidnidæ*.

Similarly with regard to the METATHERIA, although the great diversity in external form, in anatomical characters, and in mode of life of the various animals of this section might lead to their division into groups equivalent to the orders of the *Eutheria*, I do not think it advisable to depart from the usual custom of treating them all as forming one order, called *Marsupialia*, the limits of which are equivalent to those of the subclass, and the primary divisions of which are called "families." The limits of these six families are extremely well marked and easily defined; and as they form a regular gradation between two extreme types, they can be satisfactorily arranged in a serial order.

The remaining Mammals are included in the EUTHERIA, PLACENTALIA or MONODELPHIA. Their affinities with one another are so complex that it is impossible to arrange them serially with any regard to natural affinities. Indeed each order is now so isolated that it is almost impossible to say what its affinities are; and none of the hitherto proposed associations of the orders into larger groups stand the test of critical investigation. All serial arrangements of the orders are therefore perfectly arbitrary; and although it would be of very great convenience for reference in books and museums if some general sequence, such as that here proposed, were generally adopted, such a result can scarcely be expected, as equally good reasons might be given for almost any other combination of the various elements of which the series is composed. In fact I have already seen reason to depart in some respects from that used in the 'Encyclopædia.'

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[1] P.Z.S. 1880, p. 649.

The *Edentata*, *Sirenia*, and *Cetacea* stand apart from all the rest in the fact that their dentition does not conform to the general heterodont, diphyodont type to which that of all other Eutheria can be reduced, and which is such a close bond of union between them. In all three orders, however, some indications may be traced of relationship, however distant, with the general type.

I must refer to a paper communicated to the Society last year for my views as to the grouping of the animals composing the Edentata, which differ from those of most, if not all, zoologists who have previously made them their study[1]. I there gave reasons for believing that the Sloths and Anteaters were nearly related, and that the Armadillos, though much modified, belonged to the same stock, but that the Pangolins and the Orycteropus each represented very isolated forms. The division of the order into four suborders here proposed is an attempt to represent these views, though not altogether satisfactory, as the present divergence between the first two families is scarcely sufficiently indicated by their association in one suborder.

There is no difficulty about the limits of the order *Sirenia*, composed of aquatic, vegetable-eating animals, with complete absence of hind limbs, and low cerebral organization, represented in our present state of knowledge by but two existing genera, *Halicore* and *Manatus*, and a few extinct forms, which, though approaching a more generalized mammalian type, show no special characters allying them to any of the other orders. The few facts as yet collected relating to the former history of the *Sirenia* leave us as much in the dark as to the origin and affinities of this peculiar group of animals as we were when we only knew the living members. They lend no countenance to their association with the Cetacea; and, on the other hand, their supposed affinity with the Ungulata receives no very material support from them.

Another equally well-marked and equally isolated, though far more numerously represented and diversified order, is that of the *Cetacea*, placed simply for convenience next to the *Sirenia*; for except in their fish-like adaptation to aquatic life they have little in common with them. The old association of these orders in one group can only be maintained either in ignorance of their structure or in an avowedly artificial system. Among the existing members of the order, there are two very distinct types, the toothed Whales or *Odontoceti*, and the Baleen Whales or *Mystacoceti*, which present as many marked distinguishing structural characters as are found between many other divisions of the Mammalia which are reckoned as orders. As the extinct *Zeuglodon*, as far as its characters are known, does not fall into either of these groups, but is in some respects an annectent form, I have placed it provisionally, at least, in a third group by itself, named *Archæoceti*. There is nothing known at present to connect the Cetacea with any other order of Mammals; but it is quite as likely that they are offsets of a primitive Ungulate as of a Carnivorous type[1].

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[1] P. Z. S. 1882, p. 358.

The remaining Eutherian Mammals are clearly united by the characters of their teeth, being all heterodont and diphyodont, with their dental system traceable to a common formula.

Although older views of the relationship of Ungulate Mammals expressed by the terms *Pachydermata*, *Ruminantia*, and so forth, still linger in some corners of zoological literature, no single point in zoological classification can be considered so firmly established as the distinction between the Perissodactyle and Artiodactyle Ungulates, both perfectly natural and distinctly circumscribed groups. The breaking-up of the latter into four equivalent sections, the *Pecora*, *Tylopoda*, *Tragulina*, and *Suina*, is equally in accordance with all known facts. Less certain, however, is the association of the *Proboscidea* and the *Hyracoidea* with the true Ungulates. By many they are each, although containing so very few existing species, made into distinct orders; and much is to be said in favour of this view. The discovery, however, of a vast number of extinct species of Ungulates which cannot be brought under the definition of either Perissodactyle or Artiodactyle, and yet are evidently allied to both, and which to a certain extent bridge over the interval between them and the isolated groups just mentioned, make it necessary either to introduce a number of new and ill-defined ordinal divisions, or to widen the scope of the original order so as to embrace them all, considering the Elephants and the Hyraces as representing suborders equivalent to the great Perissodactyle and Artiodactyle groups. It is the latter alternative that I have adopted.

In the association of the three orders *Insectivora*, *Cheiroptera*, and *Rodentia*, and in their subdivisions, I have followed Mr. Dobson's article in the 'Encyclopædia.' They appear to resemble each other in presenting a lower type of placentation to that of the other Eutherians, shown in the important part played by the umbilical vesicle, which becomes adherent to a considerable part of the inner surface of the chorion and conveys bloodvessels to it; but the few observations hitherto made upon this subject require to be confirmed and extended before it will be safe to attach much weight to them. This and other cranial and cerebral characters indicate that they occupy an inferior grade of development in the Mammalian series; but there are difficulties in interposing them in any other position than that assigned to them here, which must not be supposed to imply any superiority over the groups placed below them, but rather that they occupy a central position, connected, as palæontology seems to show, with the Carnivora on the one hand and the Ungulata on the other. In the 'Encyclopædia' they were placed at the bottom of the diphyodonts, between the Cetacea and the Ungulates; but this had the disadvantage of widely separating these probably allied groups, and of removing the Insectivora entirely from the Carnivora, with which they form a somewhat natural sequence.

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[1] On the question of the origin and affinities of the Cetacea, see a lecture delivered at the Royal Institution of Great Britain, May 25th, 1883, and published in 'Nature,' June 28th and July 5th, 1883.

The *Chiroptera* have always been placed near the *Insectivora*; but they are really a highly specialized group, as much isolated from all other Mammals by the modification of their anterior limbs in adaptation to aerial locomotion, as the Cetacea and the Sirenia, by the absence of hind limbs, are specially adapted to aquatic life. The *Rodentia*, though generally presenting a low grade of development, are also a specialized group. The position here assigned to them would accord with apparent relationships with the Ungulates, through the Elephant on the one hand, and the extinct *Mesotherium* on the other.

In the present state of the fauna of the earth, the *Carnivora* form a very distinct order, though naturally subdivided into two groups, the members of the one being more typical, while the other (the *Pinnipedia*) are aberrant, having the whole of their organization specially modified for living habitually in the water.

Lastly, the *Primates*, which in any natural system must be placed at the head of the series, are divisible into two very distinct groups—one containing the various forms of Lemurs (*Lemuroidea*), and the other containing the Monkeys and Man (*Anthropoidea*). Whether the *Lemuroidea* should form part of the Primates (according to the traditional view), or a distinct order altogether removed from it, is as yet an undetermined question, for both sides of which there is much to be said. There can, however, be no doubt that the *Anthropoidea* form a perfectly natural group, presenting a series of tolerably regular gradations from the Marmosets (*Hapale*) to Man. Certain breaks in the series, however, enable us to divide it into five distinct families:—*Hapalidæ* or Marmosets; *Cebidæ* or American Monkeys, with three premolar teeth on each side of each jaw; *Cercopithecidæ*, containing the majority of Old-world Monkeys; *Simiidæ*, consisting of the genera *Hylobates*, *Simia*, *Gorilla*, and *Troglodytes*, the true Man-like Apes; and, lastly, *Hominidæ*, containing the genus *Homo* alone.

ORDERS, SUBORDERS, AND FAMILIES OF EXISTING MAMMALS.

Subclass PROTOTHERIA or *Ornithodelphia*.

Order **MONOTREMATA.**

Ornithorhynchidæ.
Echidnidæ.

Subclass METATHERIA or *Didelphia*.

- Order **MARSUPIALIA.**
    - Didelphidæ.
    - Dasyuridæ.
    - Peramelidæ.
    - Macropodidæ.
    - Phalangistidæ.
    - Phascolomyidæ.

Subclass EUTHERIA or *Monodelphia*.

- Order **EDENTATA.**
    - Suborder **PILOSA.**
        - Bradypodidæ.
        - Myrmecophagidæ.
    - Suborder **LORICATA.**
        - Dasypodidæ.
    - Suborder **SQUAMATA.**
        - Manidæ.
    - Suborder **TUBULIDENTATA.**
        - Orycteropodidæ.
- Order **SIRENIA.**
    - Manatidæ.
    - Halicoridæ.
- Order **CETACEA.**
    - Suborder **MYSTACOCETI.**
        - Balænidæ.
    - Suborder **ODONTOCETI.**
        - Physeteridæ.
        - Platanistidæ.
        - Delphinidæ.
- Order **UNGULATA.**
    - Suborder **ARTIODACTYLA.**
        - SUINA.
            - Hippopotamidæ.
            - Phacochœridæ.
            - Suidæ.
            - Dicotylidæ.
        - TRAGULINA.
            - Tragulidæ.
        - TYLOPODA.
            - Camelidæ.

2. Contributions to a proposed Monograph of the Homopterous Family Cicadidæ.—Part I. By W. L. Distant.

[Received April 16, 1883.]

(Plate XXV.)

I have for some years studied this interesting family of insects and collected materials for a monograph of the same; but finding that the difficulties are more considerable than I anticipated, and that such a work will still require much greater time to produce, I propose from time to time to offer contributions towards a knowledge of the Cicadidæ, hoping ultimately to publish a more or less complete monograph of the whole family. The Society has already (P. Z. S. 1882, p. 125) done me the honour of printing the results of my examination of the species contained in the Godeffroy Museum at Hamburg; and the present paper is chiefly devoted to the collection in the Dresden Museum, including the species collected in Celebes by Dr. A. B. Meyer, which are of considerable interest, producing a somewhat remarkable new genus. I have added the descriptions of a few species contained in my own and in the very rich collection of Dr. Signoret of Paris, at the bulk of which I am still working, and hope to give the result very shortly. By the examination of these foreign collections, and more especially by a comparison of the same with Walker's numerous types of his indifferently described species in the British Museum, much necessary and preparatory work will be effected.

Zammara luculenta, n. sp. (Plate XXV. figs. 4, *4a*, *4b*.)

♂. Head ochraceous; the front greenish with the centre fuscous; the vertex with the anterior margin and area of the ocelli fuscous. Pronotum ochraceous, the posterior and lateral margins greenish, with a fuscous T-shaped central spot near the anterior margin, and a small central pale ochraceous spot near the posterior margin. Mesonotum greenish, with two obconical central spots on anterior margin, which are ochraceous and broadly and transversely marked with fuscous, followed by a W-shaped fuscous fascia which is situate immediately before the cruciform elevation, which is more or less ochraceous. Abdomen above reddish ochraceous, the disk and lateral margins longitudinally suffused with fuscous. Underside of head and thorax, legs and opercula greenish; abdomen beneath reddish ochraceous, with the posterior margin of the penultimate segment fuscous. Tarsi ochraceous, the claws fuscous. Rostrum greenish ochraceous, the tip pitchy and reaching the base of abdomen. Tegmina and wings pale hyaline, their bases narrowly reddish ochraceous, and the venation with the basal half greenish, the remainder ochraceous. The face is long, moderately convex, distinctly transversely striated, but without a longitudinal sulcation; the opercula are small and obliquely rounded, the tympanal orifices very large and uncovered; and the head (including outer margins of eyes) is about equal in width to the base of the mesonotum.

Long. 24 millim.; exp. tegm. 85 millim.

Hab. (unknown). (Mus. Dresden.)

The unspotted tegmina, apart from the structural peculiarities, render this species very distinct.

TETTIGARCTA CRINITA, n. sp. (Plate XXV. figs. 5, 5*a*, 5*b*, 5*c*.)

♂. Body above reddish ochraceous. Head with the front clothed with very long fuscous hairs, and with a thick and long tuft of the same at base of vertex (which is slightly convex), stretching across the ocelli; eyes dull obscure grey mottled with brownish. Pronotum wrinkled and rugulose, the lateral angles broadly truncate and slightly concave, the lateral margins rounded, reflexed and somewhat ampliated; a moderately raised subovate space at anterior margin which is hairy, on each side of which are two connected rounded spots with fuscous margins, the outer of which are most distinct. Cruciform elevation at base of mesonotum elongate, its base petiolate. Abdomen with the posterior segmental margins fuscous and hairy. Body beneath and legs ochraceous, thickly clothed with greyish hair; apices of tibiæ, apices of tarsal joints, and claws castaneous. Rostrum reaching posterior coxæ and with its apical half pale fuscous. Face conically compressed and covered with long fuscous hairs. Tegmina subargentaceous or pale talc-like, the venation, costal membrane, and basal and claval areas ochraceous; a small fuscous spot beneath and near the end of costal membrane, and a few small fuscous markings near base. Wings subargentaceous or pale talc-like, the venation ochraceous, and the base narrowly pale fuscous.

Long. 32 millim.; exp. tegm. 80 millim.

Hab. Australia, *sic.* (Mus. Dresden.)

This species differs from *T. tomentosa*, the only other described species of the genus, in the non-pointed and truncate lateral angles of the pronotum, the paler tegmina, and absence of the fuscous macular markings on their apical halves, &c.

The extent of this genus and its exact habitat are still interesting questions. It is now nearly forty years since Adam White described the genus from specimens of a single species collected during Eyre's expedition of discovery in Central Australia; and the only habitat given was "Australia." Now a second species is found in the Dresden Museum, but also with the same loosely worded habitat.

DUNDUBIA RAFFLESII, n. sp.

♂. Head and body above ochraceous, moderately and palely pilose. Eyes pale brown mottled with fuscous, ocelli bright castaneous; posterior and lateral margins of pronotum greenish ochraceous; mesonotum with two central pale and subobsolete obconical spots situate at anterior margin, with an obscure pale fuscous oblique streak on each side. Body beneath and legs ochraceous; opercula reaching the third abdominal segment, slender, concavely constricted on each side near base, and then again convexly widened to apex, which is rounded; rostrum about reaching posterior coxæ, with its apex narrowly fuscous. Tegmina and wings pale hyaline; veins and costal membrane of tegmina ochraceous.

Long. 30 millim.; exp. tegm. 73 millim.

Hab. Java. (Coll. Dist.)

This species is allied to *D. rufivena*, Walk., from which it differs in its larger and more robust body and much more slender opercula, which in *D. rafflesii* are not perceptibly broader at the apex than at the base, which is quite the reverse of what obtains in *D. rufivena*.

COSMOPSALTRIA MEYERI, n. sp. (Plate XXV. figs. 2, 2*a*, 2*b*.)

Body above castaneous. Head with the vertex and front nearly completely suffused with blackish; ocelli and eyes yellowish. Pronotum with a central black longitudinal fascia, the posterior and lateral margins obscure ochraceous. Mesonotum with two large contiguous black obconical spots on anterior margin, a large, lateral, subconical black fascia on each side, and a triangular black fascia in front of cruciform elevation, the apex of which is produced between the central obconical spots, and which also possesses posteriorly a central and angulated base. Abdomen very dark castaneous. Body beneath and legs dark castaneous; sternum and base of abdomen thickly and palely pilose; opercula ochraceous, extending to about base of fourth abdominal segment, concavely constricted beyond base, and then slightly and convexly rounded to apex, apical portion distinctly narrower than base (rostrum mutilated). Tegmina and wings pale hyaline; the first slightly infuscated, with the costal membrane, basal area, and veins brownish or fuscous, transverse veins at bases of second and third apical areas infuscated, and two small submarginal fuscous spots at apices of veins enclosing first and second apical areas; wings with anterior claval margin and a basal streak pale fuscous.

The face is very convexly tumid, wna a ithrrow central discal sulcation, transverse striations becoming more profound from base to apex; the anterior femora are armed with two strong spines, one near base and one near apex; between the last and apex is a small and somewhat rudimentary spine.

Long. 50 millim.; exp. tegm. 132 millim.

Hab. Celebes (*A. B. Meyer*). (Mus. Dresden.)

This species is allied to *C. spinosa*, Fabr., from which it differs in its different markings both of body and tegmina, the longer and differently shaped opercula, &c.

PERISSONEURA, n. gen.

♀. Head triangular, the front prominently and subacutely produced; the vertex with the lateral margins slightly convex behind the eyes and prominently produced in front of the eyes. Pronotum at posterior angles about twice as broad as anterior margin, the posterior angles ampliated, deflexed to base of tegmina, and broadly rounded at apices. Abdomen above distinctly and longitudinally raised and carinate. Face very prominent, strongly compressed and wedge-shaped, concavely narrowing on its apical half. Rostrum reaching the intermediate coxæ. Tegmina elongate; the costa very slightly depressed immediately beyond base, and then slightly raised and convex from about the apex of upper ulnar area; the interior ulnar area with the apex slightly but distinctly broader than base; the space between the apices of the postcostal vein and the postcostal ulnar ramus ampliated, and the costal margin very finely hirsute; apical areas eight, the eighth broadest and shortest; an additional curved and rudimentary vein connecting the base of the second and the apex of the fifth ulnar areas, this vein is distinct and perfect for a short distance from the base of the second and into the third ulnar areas, after which it is subobsolete; basal area almost twice as long as broad.

My knowledge of this most interesting genus is confined to a female specimen collected by Dr. A. B. Meyer in Celebes.

PERISSONEURA MACULOSA, n. sp. (Plate XXV. figs. 3, *3a*, *3b*.)

♀. Pale ochraceous or greenish; ocelli castaneous; mesonotum with two central obconical dark spots, the bases of which rest on anterior margin; on each side of these is a much longer and more acutely pointed spot, and a small round spot in front of each anterior branch of the cruciform basal elevation, which is marked by two central darker lines; abdomen above sparingly pilose, the apical segmental margins paler. Body beneath and legs pale ochraceous or greenish; femora near apices, tibiæ near bases and at apices, and apices of tarsi fuscous. Rostrum with the apex pitchy. Tegmina and wings pale hyaline, the first minutely spotted along all the veins and more or less across its apical half.

Long. ♀, 18 millim.; exp. tegm. 56 millim.

Hab. Celebes (*Dr. Meyer*). (Mus. Dresden.)

TIBICEN ? LIFUANA, Montr.

Cicada lifuana, Montr. Ann. Soc. Ent. de Fr. sér. 4, i. p. 70. 3 (1861).

♂. Head and pronotum pale ochraceous, the last with two central longitudinal pale brownish lines, the posterior margin greenish with its inner border and the lateral margins pale brownish. Mesonotum pale brownish, the lateral margins and cruciform elevation ochraceous. Abdomen warm ochraceous, the disk brownish and the base of the last segment broadly blackish. Body beneath and legs ochraceous. Tegmina and wings pale hyaline. Tegmina with the costal membrane and basal half of venation greenish, remaining venation and claval area brownish. Wings with the venation brownish, the claval area more or less suffused with the same colour.

Rostrum reaching posterior coxæ, its apex dark fuscous. The face is moderately broad, the central sulcation deep, and the transverse striations distinct. Anterior femora armed with three strong spines, the one near apex smallest. Posterior femora with a few long slender spines on each side. Opercula small and oblique, not passing the base of abdomen.

Long. 21 millim.; exp. tegm. 62 millim.

Hab. New Caledonia (*Layard*). (Coll. Dist.)

Other specimens from the same locality in the collection of Dr. Signoret, which I have since examined, are somewhat darker in hue, especially the anterior legs, which are brownish.

Montrouzier's description is so slight that I certainly should have failed to identify his species had I not received specimens so labelled from Dr. Signoret. I have therefore given a full description of this insect, which I have placed provisionally in the genus *Tibicen*. From this, however, it somewhat differs in the ulnar veins at base, which, though distinctly separated, are yet contiguous, thus approaching the genus *Melampsalta*.

MELAMPSALTA OLDFIELDI, n. sp.

♀. Head, pronotum, and mesonotum greenish; abdomen greenish ochraceous, a central longitudinal castaneous fascia extending from base of head to apex of abdomen. Head with four large black spots on vertex, two at area of ocelli, and two in front of eyes; mesonotum with pale ochraceous margins to the central castaneous fascia; central base of abdominal margins blackish. Body beneath pale greenish ochraceous; face castaneous with its whole central disk black. Tegmina and wings pale hyaline; tegmina with the costal membrane and basal venation greenish, remaining venation pale fuscous; claval area and that between the postcostal vein and the postcostal ulnar ramus warm ochraceous.

Wings with the base ochraceous, the claval area more or less suffused with the same colour, the veins greenish, becoming fuscous towards outer margin.

The anal sheaths enclosing ovipositor are fuscous, and project considerably beyond the apex of the abdomen; the ovipositor is dark castaneous, the last abdominal segment being triangularly excavated at its emergence; the rostrum just passes the intermediate coxæ, and has its apex castaneous; the face is laterally compressed and concave on each side, the central sulcation being very deep.

Long. 21 millim.; exp. tegm. 55 millim.

Hab. New Holland, *sic.* (Coll. Signoret.)

The broad central castaneous fascia on the upperside of the body of this species renders it very distinct from the other numerous Australian species of the genus.

CARINETA CROCEA, n. sp. (Plate XXV. figs. 1, 1*a*, 1*b*.)

♂. Body and legs dull ochraceous and sparingly pilose. Head above strongly hirsute, with the area of the ocelli infuscated. Pronotum with a short basal longitudinal castaneous spot. Mesonotum with two obconical black-margined spots at anterior margin, on basal sides of which are two small black marginal spots, a castaneous transverse spot in front of the cruciform elevation, on each side of which is a subquadrate black spot. Beneath, the abdomen is rather darker in hue; the rostrum has its apex pitchy, which about reaches the posterior coxæ; and the anterior femora are armed beneath with three strong spines. Tegmina and wings pale hyaline, the venation of the first pale ochraceous, of the last more or less fuscous; first apical area of the tegmina about one third longer than the second.

Long. 19 millim.; exp. tegm. 60 millim.

Hab. Colombia. (Mus. Dresden.)

CARINETA CINGENDA, n. sp.

♂. Head and thorax above greenish ochraceous. Head with a lateral black margin to front, and vertex with the area of the ocelli marked with black; eyes fuscous. Pronotum with two looped oblique black lines on disk directed towards the eyes, followed beneath by two black toothed and curved lines, and with a narrow basal submarginal blackish fascia. Mesonotum with two short central obconical spots at anterior margin distinctly margined with black; on each side of these is a longer, somewhat similarly shaped and fainter spot; two small fuscous spots in front of the basal cruciform elevation, on each side of which is a laterally curved fascia completely covered with long ochraceous pilosity. Abdomen above warm ochraceous, the segmental incisures regularly and narrowly margined with very dark fuscous. Body beneath and legs sparingly pilose; anterior femora armed beneath with three prominent and robust dark-coloured spines, one near base and two near apex; rostrum just passing intermediate coxæ, its apex black; claws fuscous. Tegmina and wings pale hyaline; the first with the costal membrane ochraceous; the venation of both more or less fuscous.

The head, including the outer margin of eyes, is about equal in width to the base of the mesonotum; the opercula are small, imperfectly covering the orifices; the first apical area of the tegmina is about one third longer than the second.

Long. ♂, 18–19 millim.; exp. tegm. 52 millim.

Hab. Madeira river, Amazons. (Coll. Dist.)

This is a distinctly marked species, the black lines to the abdomen above being very characteristic.

CARINETA APICALIS, n. sp.

♀. Head and thorax above greenish, tinged with ochraceous; ocelli shining ochraceous, their are adull ochraceous; eyes pale or dark fuscous; mesonotum faintly marked at anterior margin with two obconical spots, the margins alone of which are ochraceous, its basal cruciform elevation pale ochraceous. Abdomen above dull ochraceous. Body beneath and legs ochraceous; face, and margins of sternum greenish; disk of abdomen castaneous. Tegmina and wings pale hyaline; the veins variable in hue—greenish, ochraceous, and fuscous. Tegmina with the first apical area one third longer than the second. Anterior femora armed beneath with three strong spines. Rostrum reaching the intermediate coxæ.

Var. A. Abdomen beneath with the lateral margins greenish.

Long. 18–19 millim.; exp. tegm. 48–54 millim.

6. Cacatua sanguinea, Gould.

Cacatua sanguinea, Gould, B. Austr. v. pl. 3; Scl. P. Z. S. 1875, p. 61.

The present collection contains five specimens of the small White Cockatoo alluded to in my former paper as having been mentioned by Mr. Forbes, but of which no example was sent. To my great surprise it turns out to be *Cacatua sanguinea*, instead of *C. citrino-cristata* as I had expected. The original specimens of *C. sanguinea* were obtained at Port Essington in N. Australia; so that its occurrence in the Timor-Laut group is not after all so very remarkable.

11. Rhipidura fusco-rufa, sp. nov. (Plate XXVII.)

Supra obscure terreno-fusca, in dorso rufescenti tincta; alis nigricantibus, tectricum minorum apicibus et secundariorum marginibus externis late rufis; subtus rufa, mento et gutture toto ad medium pectus albis; subalaribus rufis; remigum marginibus internis fulvis; caudæ nigricantis rectricibus tribus externis totis et paris proximi apicibus rufis; rostro et pedibus nigris. Long. tota 7·0, *alæ* 3·3, *caudæ* 3·4.

♀. *Mari similis.*

Hab. insulas Tenimberenses Larat, Moloe et Loetoe.

Obs. Sp. rostro robusto lato, cauda parum graduata fusco et rufo bipartita insignis.

There are 14 specimens of this apparently new and very distinct *Rhipidura* in the present collection, from the three localities above mentioned. The irides are marked "dark brown," and the legs and feet "black."

The bill is broad and robust, and the rectrices but slightly graduated, the external being only about 0·4 inch shorter than the middle pair; so that the species would appear to come in the same division as nos. 12 and 13 of Count Salvadori's list.

12. Rhipidura opistherythra, sp. nov.

Supra cineraceo-fusca, dorso postico castaneo-rufo; loris albidis; alarum nigricantium marginibus externis rufescentibus; subtus pallide fulva, gutture albo, crisso castaneo, hypochondriis rufescenti lavatis; caudæ elongatæ et valde graduatæ rectricibus rufescentibus, supra castaneo extus marginatis; rostro superiore nigro, inferiore ad basin et pedibus pallidis. Long. tota 6·7, *alæ* 3·4, *caudæ rectr. med.* 3·8, *ext.* 2·5, *tarsi* 0·9.

Hab. insulas Tenimberenses Larat et Maroe.

Obs. Sp. gutture albo et dorso postico et crisso castaneis, sicut videtur, facile dignoscenda.

The two specimens of this species in the collection are both marked as female; but the male would probably not differ in coloration. "Irides dark brown; upper mandible sooty brown, lower mandible same at top but pale flesh-colour at the base; feet lavender-pink."

The species belongs to the section with small bill and the tail-feathers much graduated, the outer pair being 1·3 inch shorter than the middle pair. Below, the tail is pale rufous, the inner webs of the rectrices passing into blackish. Above, the outer tail-feathers are margined externally at their bases with the chestnut-red of the rump.

15. GRAUCALUS UNIMODUS, Scl. P. Z. S. 1883, p. 55.

The present collection contains two males and two females of this species, which was described from a single female example. The sexes are not quite similar, as will be seen from the subjoined amended diagnoses.

♂. *Cinereus; fronte, loris et capitis lateribus cum gutture toto ad medium pectus æneo-nigris; alis et cauda, nigris illis cinereo extus marginatis; subalaribus pallide isabellinis; remigum pagina inferiore albicanti-cinerea; rostro et pedibus nigris. Long. tota* 13·5, *alæ* 7·3, *caudæ* 6·5, *tarsi* 1·3.

♀. *Mari similis, sed paulum obscurior et colore nigro nisi in loris carens; crassitie paulo minore.*

20. PACHYCEPHALA FUSCO-FLAVA, sp. nov. (Plate XXVIII.)

Pachycephala, sp. inc. ♀, Scl. *suprà*, p. 51.

Supra olivaceo-viridis, alis caudaque nigris, olivaceo limbatis; subtus fulvescenti-flava, in ventre imo et crisso flavicantior, lateribus capitis rufescentibus; subalaribus et remigum marginibus internis ochracescenti-albis; rostro nigro, pedibus corylinis. Long. tota 7·3, *alæ* 4·2, *caudæ* 3·3.

♀. *Mari similis, sed colore corporis subtus ochraceo distinguenda.*

Hab. Larat, ins. Tenimberensem.

The first collection contained a single female example of the present species, which I was unwilling to describe. We have now a male from the same island, which enables me to characterize the species. It would appear to belong to sect. I *c* of Count Salvadori's arrangement; but, as noted above, the sexes are not quite similar in coloration.

The male is labelled "irides dark brown, legs and feet sooty blue;" the female, "irides dark brown; legs and feet black."

21. STIGMATOPS SQUAMATA, Salvad. Orn. Pap. ii. p. 386.

Nectarinia, sp. inc., Scl. suprà, p. 51.

The former collection contained two skins in bad condition (marked "♀") which I thought might probably be referable to a female of some species of *Nectarinia*. The present collection comprehends nine specimens of the same bird of both sexes. It is evidently a Meliphagine bird of the genus *Stigmatops*, and, so far as I can tell without actual comparison with the types, inseparable from *S. squamata* of Salvadori. This species was discovered by Rosenberg on Khor Island between the Ké group and Ceram laut, and may therefore probably also occur in the Tenimber group, from which Khor lies not very far north.

23. ZOSTEROPS GRISEIVENTRIS, sp. nov.

Supra læte viridis, annulo periophthalmico distincto albo; alis caudaque nigricantibus viridi limbatis; subtus pallide grisea, in ventre medio albicantior, gula et crisso flavis; subalaribus et remigum marginibus internis albis, campterio flavido; rostro pallide corneo, pedibus pallide fuscis: long. tota 4·7, *alæ* 2·5, *caudæ* 1·7.

Hab. Larat, Loetoe et Moloe insulas Tenimberenses.

There are sixteen specimens of this apparently new *Zosterops* in the present collection, obtained at various dates in the localities above mentioned. The irides are noted as "reddish brown."

The species belongs to the group of *Z. albiventris*; but appears to be distinguishable by its greyish abdomen, which is only whiter in the middle line.

24. GERYGONE DORSALIS, sp. nov.

Supra brunnescenti-castanea, alis caudaque nigris dorsi colore limbatis, pileo et nucha murino-brunneis; subtus alba, hypochondriis rufescenti lavatis; subalaribus albis; caudæ rectricibus subtus in pogoniis interioribus nigricantibus macula versus apicem alba præditis; rostro et pedibus nigris: long. tota 4·0, *alæ* 2·1, *caudæ* 1·6, *tarsi* 0·8.

♀. *Mari similis.*

Hab. Larat, Loetoe et Moloe insulas Tenimberenses.

I was rather uncertain as to the correct position of this little bird, which is quite distinct from any thing that I am acquainted with; but Count Salvadori, to whom I have sent a skin for examination, kindly tells me it is a *Gerygone*. The bill is rather compressed, and the tarsi are long and slender. The third, fourth, fifth, and sixth primaries are nearly equal and longest. The irides are noted as black.

25. MIMETA DECIPIENS, sp. nov.

Fuscus fere unicolor, superciliis albidis, pileo nigricanti striolato; subtus paulo dilutior, gutture et cervice antica albis, præcipue ad latera nigro guttulatis; pectoris summi plumis quibusdam nigricanti striolatis; regione auriculari nigricante; rostro et pedibus nigris: long. tota 11·8, *alæ* 6·5, *caudæ* 5·0.

Hab. Larat insulam Tenimberensem.

Obs. Similis *M. bouroensi*, sed gula albida nigro transversim guttulata et pectoris summi plumis nigricanti striolatis distinguendus.

Two specimens of this *Mimeta*, marked "irides dark brown," are in the collection. They so closely resemble *Philemon plumigenis* in general appearance, that I had at first marked them as of that species[1].

Adding the new species now described and *Cacatua sanguinea* and *Stigmatops squamata* to the list given in my first communication we shall find that, so far as we are acquainted with the birds of the Tenimber Islands from Mr. Forbes's researches, its avifauna embraces the following 60 species, of which the 23 marked with an asterisk are peculiar to the group.

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[1] *Cf.* Wallace, P. Z. S. 1863, p. 26, on a similar case of mimicry in another species of this genus.

I. ACCIPITRES.

1. Pandion leucocephalus.
2. Haliastur girrenera.
3. Tinnunculus moluccensis.
*4. Ninox forbesi.
*5. Strix sororcula.

II. PSITTACI.

*6. Tanygnathus subaffinis.
7. Geoffroius keiensis.
*8. Eclectus riedeli.
*9. Eos reticulata.
10. Cacatua sanguinea.

III. PICARIÆ.

11. Sauropatis chloris.

IV. PASSERES.

*12. Monarcha castus.
*13. —— mundus.
14. —— nitidus.
*15. Rhipidura hamadryas.
*16. —— fusco-rufa.
*17. —— opistherythra.
*18. Myiagra fulviventris.
*19. Micrœca hemixantha.
*20. Graucalus unimodus.
21. —— melanops.
*22. Lalage mœsta.
23. Artamus leucogaster.
24. Dicruropsis bracteatus.
*25. Pachycephala arctitorquis.
*26. Pachycephala fusco-flava.
*27. Dicæum fulgidum.
*28. Myzomela annabellæ.
29. Stigmatops squamata.
30. Philemon plumigenis.
*31. Zosterops griseiventris.
*32. Gerygone dorsalis.
*33. Mimeta decipiens.
34. Geocichlæ sp. inc.
35. Munia molucca.
36. Erythrura tricolor.
37. Calornis metallica.
*38. —— crassa.
39. Corvus validissimus.

V. COLUMBÆ.

40. Ptilopus wallacii.
41. —— xanthogaster.
42. Carpophaga concinna.
43. —— rosacea.
44. Myristicivora bicolor.
45. Macropygiæ sp. inc.
46. Geopelia maugæi.
47. Chalcophaps chrysochlora.

VI. GALLINÆ.

*48. Megapodius tenimberensis.

VII. GRALLATORES.

49. Orthorhamphus magnirostris.
50. Charadrius fulvus.
51. Ægialitis geoffroi.
52. Lobivanellus miles.
53. Totanus incanus.
54. Numenius variegatus.
55. Ardea sumatrana.
56. Demiegretta sacra.

VIII. NATATORES.

57. Nettapus pulchellus.
58. Dendrocygna guttata.
59. Tadorna radjah.
60. Onychoprion anæsthetus.

4. A Monograph of *Limnaina* and *Euplœina*, two Groups of Diurnal Lepidoptera belonging to the Subfamily Euplœinæ; with Descriptions of new Genera and Species. By F. Moore, F.Z.S., A.L.S., &c.

Part I. *Limnaina.*

[Received April 2, 1883.]

(Plates XXIX–XXXII.[1])

The group of Butterflies here monographed has, by modern authors, been arranged under the subfamily name of Danainæ. By Linnæus (Syst. Nat. 1758, p. 470) they were placed in the second division of his Papiliones Danai, namely in that of the *D. festivi*, his first division, containing the "Whites" or modern Pierinæ, being the *D. candidi*.

Esper in 1777 (Die Schmett. i. p. 53) having figured several species of Pierinæ under the generic term *Danaus*, both Fabricius (Ent. Syst. iii. p. 39, 1793) and Weber (Nomen. Ent. pp. 99, 106, 1795) having also entirely separated the *D. festivi* from the *D. candidi* under the name of *Festivi*, and Cuvier (Tableau Elément. p. 590, 1798) having cited species of Pierinæ only as Danai, it follows that these authors, having thus restricted the Danai of Linnæus to the *D. candidi* (or modern Pierinæ), the term "Danainæ" cannot be retained for the present subfamily.

The following summary of the labours of subsequent authors will help to show the progress made in the study of this interesting group of Butterflies.

Latreille in 1805 (Hist. Nat. des Crust. et Insectes, xiv. p. 108) established his genus *Danaida*, giving as the type *Papilio plexippus* (one of the species mentioned in the Linnean division *D. festivi*), and citing America as the habitat of that species. In 1807 he altered this name to *Danais*, and in 1809 to that of *Danaus*[2].

In 1807 Fabricius (Illiger's Mag. vi. p. 280) established his genus *Euplœa*, giving as the types the *P. plexippus* and *P. similis* of Linnæus, and *P. corus*, a species of his own.

Hübner (Verz. bek. Schmett. pp. 14–17, 1816) arranged the group of the then described species in his second Stirps of the tribe Nymphales, under the name of Limnades—equivalent to the Linnean *Danai festivi* and the Fabrician *Festivi*—his first stirps being the Nereides, comprising the Heliconii of the later authors. The species known to him are divided into three sections, the first and second being equivalent to the *Danais* and *Hestia* of Doubleday, and the third to *Euplœa* of the same author; the species of the first and second sections are arranged under the briefly characterized genera *Amauris, Hestia, Euplœa,* and *Anosia,* those of the third section under *Trepsichrois, Crastia,* and *Salpinx.*

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[1] Plates XXIX.–XXXII. will be given along with Part II. of the present paper, read May 1st.

[2] See notes to genus *Anosia*, p. 234 *postea.*

In 1819 Godart, in vol. ix. of the 'Encyclop. Méthodique,' redescribed the then known species, under the genus *Danais*.

The next author in point of date is Horsfield, who, in 1828, published the first part of the 4to Catalogue of the Lepidoptera in the Museum of the East-India Company, and on plate 3 of that work contributed illustrations of the larvæ of five species which he reared in Java.

In 1836, Boisduval ('Species général des Lépidoptères,' p. 165) arranges the group in his seventh family of the Rhopalocera.

Doubleday and Hewitson, in their grand work 'The Genera of Diurnal Lepidoptera,' p. 84 etc. (1847), limited the Danaidæ to the three genera *Euplœa*, *Danais*, and *Hestia*, placing *Hamadryas* at the end of the family Heliconidæ. In *Euplœa* the species enumerated are 37 in number; and these are arranged in succession, mostly according to the presence of the "sexual mark" or, as it is termed, "vitta" on the inner margin of the fore wing in the male. In *Danais*, these authors arrange the species into four unnamed groups, which they state to be "easily distinguished in general by the form and markings of the wings, independently of slight structural differences." The first group contains the species named *phædon*, *ægialea*, *echane*, *niavius* and its allies, "all African species, the males of which have a patch of peculiarly formed scales situated on the submedian nervure of the hind wing." The second group is composed mostly of the fulvous species, which have the sexual spot on the first median nervule, viz. *gilippus*, *erippus*, *chrysippus*, *plexippus*, *affinis*, &c. The third group contains "the species having the sexual spot upon the first median nervule or submedian nervure," viz. *aglea*, *cleona*, *melissa*, *similis*, *limniace*, *juventa*, *tytia*, *albata*, &c. In the fourth group are placed those species in which the sexual spot is absent.

In the Rev. et Mag. Zool. 1853, M. Lucas described several new species of the genus *Euplœa*.

In 1857, in the 8vo Catalogue of Lepidoptera of the East-India Company's Museum, pp. 121 to 135, I enumerated the species of *Danais*, *Euplœa*, *Ideopsis* (n. gen.), and *Hestia* then in the collection, described several new species, and figured various larvæ and pupæ.

In 'Exotic Butterflies,' vols. ii. and iii. 1858–66, Hewitson described and figured some very interesting new species of *Euplœa*.

In 1862, Mr. Bates published, in the Transactions of the Linnean Society, vol. xxiii. part 2, his "Contributions to the Insect fauna of the Amazon valley." In this memoir the systematic positions of the subfamilies Heliconinæ and Danainæ (including the Danaoid Heliconinæ) are most laboriously treated of, the Danaoid Heliconinæ being placed at the head of the Order Lepidoptera. In this memoir also Mr. Bates makes known the extraordinary phenomenon of mimicry occurring in the Heliconidæ and in other families of Butterflies, as well as in Moths.

In his 'Prodromus Systematis Lepidopterorum,' published in 1865, Herrich-Schäffer places the HELICONINA and DANAINA as the first and second families of the Butterflies. In Heliconina, besides the true Heliconidæ, he groups those genera separated by Mr. Bates as Danaoid Heliconinæ, as well as the genera *Hamadryas*, *Euplœa*, and *Hestia*, restricting the Danaina to the genus *Danais* only.

In January 1866 Mr. Butler (Proc. Zool. Soc. 1866, pp. 43–59) published his "Monograph of the Genus *Danais*." This monograph, which is a revision of the species known to the author at that time, is also accompanied with descriptions and figures of new species contained in the British-Museum collection. All the species are here arranged under *Danais*, which is divided into four uncharacterized numerical sections, as follows:—1ST. SECTION, comprising the *Amauris* group; 2ND SECTION, the American species *berenice*, *gilippus*, &c., *chrysippus*, *plexippus* (*genutia*), and allies; 3RD SECTION, *similis*, *limniace*, *aglea*, *melaneus*, *cleona*, &c.; 4TH SECTION, *gaura* and *daos*.

This monograph was followed in March by a Supplement (P. Z. S. 1866, pp. 171–175) enumerating and describing other species, characters being added (founded chiefly upon the colour and pattern) to the four sections as given above.

In May of the same year Mr. Butler published (P. Z. S. 1866, pp. 268–302) a "Monograph of the genus *Euplœa*," containing also descriptions and figures of new species in the British-Museum collection. The species are here arranged under *Euplœa*, which is broken up into ten divisions, characterized by their colour, form, and pattern of markings.

In the following year Mr. Butler also published (Trans. Ent. Soc. 1867, pp. 467–484) a "Monograph of the genus *Hestia*," containing descriptions of new species, and also a tabular résumé of all the species of family Danaidæ then described.

Dr. Felder, in the 'Reise der Novara,' Lepidoptera, part ii., describes and figures a number of species of Danainæ. As the date of publication of this part of the 'Reise der Novara' has been much discussed by Lepidopterists, the following remarks may not here be out of place.

Of part ii. of this work, though it bears the date of 1865 upon the title-page, the actual issue by the publishers appears not to have been effected till the beginning of 1867. There is no entry of it in the 'Zoological Record' for 1865. In the 'Record' for 1866 (published in 1867), the compiler of the list of works on Lepidoptera states (p. 433) that "this part was not procurable in 1866, and that he had been informed that an application for it made in February 1867 was unsuccessful." This is surely sufficient to show that Part ii. was not issued for sale, and therefore *not published*, at the date specified on its title-page. The date there so given may be that of the completion and lettering of the last plates (pl. 47 bearing that of Oct. 1865), which possibly may be considered as being equivalent to our mode of publication.

In 1869 was published the British-Museum "Catalogue of Diurnal Lepidoptera described by Fabricius," compiled by Mr. Butler, in which the species of Danainæ are enumerated, accompanied by the original Fabrician descriptions.

From 1870 to 1877 numerous collections, from various eastern countries, containing new species of Danainæ were received at the British Museum. These were described by Mr. Butler as follows:—

Ann. & Mag. Nat. Hist. ser. 4, vol. v. p. 357, 1870. New species of *Euplœa* and *Danais* from the South-Sea Islands.

Trans. Ent. Soc. 1875, p. 2. Species from Australia of a n. g. *Calliplœa*.

Ditto, 1876, p. 240. Species from New Guinea.

P. Z. S. 1876, p. 765. Species of *Euplœa* and *Calliplœa* from New Guinea.

P. Z. S. 1877, p. 466. The same.

P. Z. S. 1877, p. 810. Species of *Salpinx* from Formosa.

Ann. & Mag. Nat. Hist. ser. 4, vol. xx. 1877, p. 348. *Euplœa* from Lifu, Loyalty Islands.

In 1871 Mr. Kirby issued his 'Syn. Catal. of Diurnal Lepidoptera,' wherein the Danainæ are all arranged under the genera *Hestia*, *Ideopsis*, *Danais*, *Euplœa*, and *Hamadryas*, which are followed by the genera of Danaoid Heliconinæ.

Hoppfer (Stettin. ent. Zeit. 1874) described some new species of Danainæ from Celebes.

Mr. Druce, in Proc. Zool. Soc. 1873 & 1874, described some Siamese and Bornean species.

Mr. Salvin and Mr. Godman also received several very interesting collections, contributing descriptions of the Danainæ as follows:—

P. Z. S. 1877, p. 140. New Euplœas from Duke-of-York Island.

P. Z. S. 1878, pp. 643, 733. *Danais* and *Euplœa* from New Guinea, New Ireland, and New Britain.

P. Z. S. 1879, p. 155. The same.

P. Z. S. 1880, p. 183. A new *Danais* from E. Africa.

Kirsch, in Mitth. Mus. Dresden, i. (1877), contributes descriptions and figures of several new species from Papua.

In 1878 a memoir on the "Butterflies hitherto referred to the genus *Euplœa*" was published in the Journ. Linn. Soc., Zool. vol. xiv. pp. 290–303, by Mr. Butler. In this paper the species are arranged under seven genera, three of which are new, the peculiar "sexual mark," or scent-producing organ of the male insect, being taken, for the first time, as the character for their separation.

In the 'Biologia Centrali-Americana' (1879) Messrs. Salvin and Godman enumerate and describe the species of Danainæ occurring in that region.

In part 1 of my 'Lepidoptera of Ceylon,' published in 1880, are described and figured the species inhabiting that island. In this work these species are arranged under ten genera, seven of which are new, the "sexual mark" being used as the primary character for the genera.

In 1882 (Ann. Nat. Hist. ser. 5, vol. x. p. 36) Mr. Butler contributes additional descriptions of twelve new species of Danainæ from Duke-of-York Island and New Britain.

In 1882 Mr. Distant published part 1 of his 'Rhopalocera Malayana,' wherein are fully described and figured all the species found in the Malay peninsula. These are arranged under the five genera *Hestia*, *Ideopsis*, *Radena*, *Danais*, and *Euplœa*, the two latter genera being further separated into sections, founded upon the "sexual mark" of the male.

The last work to be enumerated is the 'Lepidoptera of India, Burmah, and Ceylon,' published at Calcutta in 1882, by Major Marshall and L. de Nicéville. These authors give copious details of the characters of the subfamily Danainæ, keys for the determination of the genera and species, and very ample descriptions of the several genera and species, which are also accompanied with notes on their habits and geographical distribution, together with some exceedingly well-executed figures. By these authors the Danainæ are divided into the four genera *Hestia*, *Ideopsis*, *Danais*, and *Euplœa*, the two latter genera being sectionized into named groups, which are based on the "sexual mark" in the males, as pointed out and named by Mr. Butler and myself.

When studying this subfamily of Butterflies in 1879, preparatory to describing the species for my work on the Lepidoptera of Ceylon, I separated the whole of the species then in my collection into groups, according to the presence and position of the "sexual mark" or "scent-producing organ" in the male insect. Having thus separated the species into such groups, I was then much surprised to observe that this operation had placed before me several species in each group which bore an extraordinary resemblance, in the pattern of the markings on the wings, to certain species which I had arranged in the other groups.

Having thus taken these "sexual marks" or, as they are now known to be, "scent-producing organs" as the primary structural character for separating the species of the old genus *Danais* and *Euplœa* into minor generic groups, these assemblies of species, thus grouped, brought to my mind at once the fact that here were evident illustrations of a form of mimicry occurring between closely related groups, and that, too, *within* a protected family of Butterflies, or, more extraordinary still, *between species of the same genera*, as it would then appear, if the species are restricted to *Danais* and *Euplœa* respectively.

At that time I had forgotten that this phenomenon of mimicry *between related genera* had been observed by my friend Mr. Bates among the Danaoid Heliconidæ; but subsequently, on again working with his memoir in the Linnean 'Transactions' before me, I became aware of his discovery.

This analogous form of mimicry, occurring in *Danais* and *Euplœa*, had, however, not previously been recorded. Certain species, it is true, when being described, were noted by Mr. Butler as having a resemblance to certain other isolated species.

Since my own observations were thus made, I have had the opportunity of showing and pointing out some of these mimetic groups in *Euplœa* to my friends Mr. Bates, Mr. Meldola, Mr.

Distant, and others; and these facts have since served as materials for discussion in certain recent articles on mimicry in Butterflies[1].

The extent to which this form of mimicry exists among the species of the old genera *Danais* and *Euplœa* will be better understood by an examination of the accompanying Tables of the five primary groups into which I have divided each of these old genera.

In these Tables the names of certain genera and species in each of these five groups are given, and the names of those genera and species, *inhabiting the same locality*, which imitate them.

These Tables were chiefly compiled from actual inspection of the several species, chiefly at the British Museum, where I had a good opportunity, by the kindness of the officers of the Zoological Department, of examining (mostly at the same time), besides the contents of their own cabinets, together with those in my own collection, Boisduval's types, Lucas's types, several of Dr. Felder's types, a large series from the collections of M. Oberthür, G. Semper, and Messrs. Salvin and Godman, all of which were most generously confided to my care for examination[2].

This imitative character pervades all the groups into which I have divided the species hitherto arranged under *Danais* and *Euplœa*; and, in the EUPLŒINA, so far as I have yet verified by actual comparison, it would appear most numerously so in Group A (see Table II.), the males of which have *no "sexual mark"* or "scent-producing organ" on the upper side of the wings, in Group B (see Table III.), the males of which possess *one "sexual mark" on the fore wing*, in Group D (see Table V.), the males of which possess *one "sexual mark" on the fore wing and a glandular patch on the hind wing*, and in Group E (see Table VI.), in which, though it contains only three genera, the species are numerously mimicked. The least amount of imitativeness yet observed and verified appears in Group C (see Table IV.), the males of which possess a *glandular patch on the hind wing* only.

On further analysis Table I. shows that, in the LIMNAINA, of the five groups into which the old genus *Danais, Hestia*, &c., have been divided, a certain number of the species are mimicked by others within these groups. These instances are but few, considering the large number of species therein, and show most clearly their highly protected condition.

Table I. A. embraces the names of certain species of the old genus *Danais* that are mimicked by species of the old genus *Euplœa*. The few species here noted would appear to indicate how small must be the necessity for attainment of further protection in the numerous species of these two highly protected genera.

Table II., Group A (*no sexual mark*). Of the 13 genera into which I have divided the species embraced within it, the second genus is mimicked by a species in one of the groups into which the old genus *Danais* has been separated; of the others, 11 genera are mimicked by species of the other groups into which the old genus *Euplœa* has been divided.

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[1] See W. L. Distant, Rhop. Malayana, p. 33 (1882); R. Meldola, Ann. Nat. Hist. 1882, vol. x. p. 417; W. L. Distant, Ann. Nat. Hist. 1883, vol. xi. p. 43. See also Wallace, 'Nature,' May 25, 1882.

[2] These Tables could have been much extended had it been possible to have brought the above collections together at the present moment.

In Table III., Group B (*one "sexual mark" on the fore wing*) is divided into 15 genera: 11 of these are mimicked by species of the other groups.

In Table IV., Group C (*glandular patch on the hind wing only*) is divided into 4 genera, 3 of which are mimicked by species of the other groups.

In Table V., Group D (*one sexual mark on the fore wing, and a glandular patch on the hind wing*) is divided into 12 genera, 9 of which are mimicked by species of the other groups.

In Table VI., Group E (*two sexual marks on the fore wing*) is divided into 3 genera, each of which genera and mostly all the species, are mimicked by species of the other groups.

Following these Tables I have drawn out one (Table VII.) in which are given "*typical examples of a mimetic set of species*, collated from each of the five groups into which *Euplœa* has been primarily divided. This Table also shows a comparative view of their structural characters.

Table I.—MIMETIC SPECIES IN LIMNAINA.

No sexual mark or scent-producing organ in hind wing of male.	One sexual mark on submedian vein.	One sexual mark between median and submedian veins.	Two sexual marks, median and submedian veins.	Two sexual marks, submedian and internal veins.	Locality.
Ideopsis anapsis	......	......	Ravadeba phyle.	......	Luzon.
—— chloris	......	......	R. cleone ...	......	Celebes.
	Amauris, sp.?	Melinda formosa.	......	......	E. Africa.
Radena similis	......	Tirumala limniace.	.....	......	China, Formosa.
—— exprompta	......	T. limniace ..	......	Chittira fumosa	Ceylon.
—— vulgaris	......	T. melissa ...	......	......	Java.
—— juventa	.. ...	T. conjuncta.	......	......	Java.
—— luzonica	......	T. orientalis.	......	......	Luzon.
—— ishma	......	T. ishmoides.	......	......	Celebes.
			Parantica grammica	Caduga larissa.	Java.
			P. melanoides	C. melaneus..	N.E. India.
			P. aglea	C. nilgiriensis	Malabar.

Table I. A.—MIMETIC SPECIES BETWEEN LIMNAINA AND EUPLŒINA.

LIMNAINA.	EUPLŒINA.					Locality.
	Group A.	Group B.	Group C.	Group D.	Group E.	
Ideopsis vitrea ...	......	Bibisana configurata.	......	......	......	Celebes.
Berethis phædon	Vonona euphon.	......	......	......	......	Mauritius.
Salatura ferruginea.	......	Rasuma guerinii.	Calliplœa jamesii.	......	Stictoplœa doleschallii	N. Guinea
—— insolata	......	Chirosa brenchleyi.	......	......	......	Solomon Isles.
—— mytilene ...	Patosa funerea.	......	......	......	......	N. Guinea
—— biseriata ...	......	Crastia illudens.	......	......	......	Duke-of-York Isles.
Tirumala septentrionis.	......	......	Trepsichrois linnæi ♀.	......	......	India, Burmah, Malacca.
—— melissa	......	......	T. claudia ♀.	......	......	Java.
—— orientalis ...	......	......	T. diocletia ♀.	......	......	Luzon.

Table II.—MIMETIC SPECIES IN EUPLŒINA (GROUP A.).

Group A.	Group B.	Group C.	Group D.	Group E.	Locality.
Vonona euphon[1]	......	......	......	......	Mauritius.
Niparia helcita	Chanapa corinna.	Calliplœa niveata.	......	Doricha sylvester.	New Caledonia, N. Australia.
Gamatoba nox	......	......	......	Stictoplœa pulla.	Aru Islands.
Patosa batesii	Chirosa pierretii.	......	......	S. immaculata.	New Guinea.
Oranasma lugens	Andasena orope.	Calliplœa hyems.	......	......	New Guinea, Timor.
Tronga crameri.........	A. suluana.	......	Isamia ægyptus.	......	N. Borneo.
—— brookei	......	......	I. lowei	......	Borneo.
—— bremeri...........	Crastia distantii.	......	I. chloe.	......	Malay peninsula.
—— marsdeni	......	......	I. singapura.	......	Singapore.
—— moorei	......	......	I. sophia ...	......	Sumatra.
—— kinbergii	C. amymone.	......	......	......	China.
Sariboa grayi...........	Chirosa vicina.	....	Hirdapa assimilata.	......	Aru.
Vadebra climena	Betanga duponchelii.	......	......	......	Amboyna, Ceram.
—— honesta...........	......	... ..	Saphara ænea	......	Solomon Islands.
Gamatoba alecto	B. megæra ...	......	......	......	Ceram.
—— cerberus	Crastia illudens.	......	......	......	New Ireland.
Menama tavayona ...	Penoa limborgii.	......	Isamia margarita.	Stictoplœa harrisii.	British Burmah.

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[1] Mimicked by *Berethis phædon*. See Table I. A.

Group A.	Group B.	Group C.	Group D.	Group E.	Locality.
Menama buxtonii	P. Pinwillii .	......	......	......	Sumatra.
Sabanasa cratis.........	......	Trepsichrois diocletia.	......	......	Philippines.
Adigama ochsenheimeri.	......	Euplœa gyllenhalii.	Tiruna ochsenheimeri.	......	Java.
—— malayica	......	E. phœbus.	......	......	Malay peninsula.
—— scudderi	......	E. butleri.	......	......	Borneo.

Table III.—MIMETIC SPECIES IN EUPLŒINA (GROUP B.).

Group B.	Group A.	Group C.	Group D.	Group E.	Locality.
Chanapa corinna	Nipara helcita.	Calliplœa niveata.	......	Doricha sylvester.	N. Australia.
Andasena eleutho......	......	......	......	D. pelor	Australia.
—— orope...............	Oronasma lugens.	C. hyems ...	......	......	Timor, New Guinea.
—— lucasii	......	......	Nacamsa meldolæ.	......	Mindanao.
—— swainsonii.........	......	......	N. simillima.	......	Luzon.
—— suluana............	Tronga crameri.	......	Isamia ægyptus.	......	N. Borneo.
Bibisana horsfieldii ...	......	......	Selinda wollenhœvii.	......	Celebes.
—— diana...............	......	......	Tabada hyacintha.	......	Celebes.
Betanga duponchelii...	Vadebra climena.	......	......	......	Amboyna, Ceram.
—— megæra............	Gamatoba alecto.	......	......	......	Ceram.
Penoa deione...........	......	Trepsichrois linnæi, ♂.	Isamia splendens.	Stictoplœa binotata.	N.E. Bengal.
—— limborgii	Menama tavoyana.	......	I. margarita.	S. harrisii ...	British Burmah.
Crastia core	......	......	Pademma kollari.	Narmada coreoides.	India.
—— asela	......	......	P. sinhala ...	N. lankana...	Ceylon.
—— grammifera	......	......	Isamia chloe.	......	Malay peninsula.
—— inconspicua	......	......	.....	Stictoplœa inconspicua	Sumatra.
—— distantii	Tronga bremeri.	......	I chloe	......	Malay peninsula.
—— amymone	T. kinbergii .	......	......	......	China.
—— illudens............	Gamatoba cerberus.	......	......	......	New Ireland.
Mahintha subdita......	......	......	Pademma masoni.	......	Tenasserim.
Chirosa brenchleyi ...	......	......	Hirdapa imitata.	......	Solomon Is.
—— eurypon	......	......	H. fraterna. .	......	Ke Islands.
—— vicina	Sariboa grayi	......	H. assimilata	......	Aru.
—— pierretii	Patosa batesii.	......	......	......	New Guinea.
Karadira andamanensis.	......	......	Tiruna rœpstorffi.	......	Andamans.
Rasuma violetta	......	Calliplœa jamesii.	......	S. doleschallii.	New Guinea.

Table IV.—MIMETIC SPECIES IN EUPLŒINA (GROUP C).

Group C.	Group A.	Group B.	Group D.	Group E.	Locality.
Calliplœa niveata......	Nipara helcita.	Chanapa corinna.	......	Doricha sylvester.	N. Australia, New Caledonia.
—— pollita	......	......	......	Stictoplœa lætifica.	Philippines.
—— hyems	Oronasma lugens.	Andasena orope.	......	......	Timor, New Guinea.
—— mazares	......	......	Selinda elusina.	......	Java.
—— ledereri	......	......	Salpinx lazulina.	......	Malacca.
—— jamesii	......	Rasuma violetta.	......	S. doleschallii	New Guinea.
Trepsichrois linnæi ♂	......	Penoa deione	Isamia splendens	S. binotata...	N.E. Bengal.
—— diocletia ♂	Sabanasa cratis.	......	......	......	Philippines.
—— mulciber ♂	......	......	......	S. tyrianthina	Borneo.
Euplœa gyllenhalii ...	Adigama ochsenheimeri.	......	Tiruna ochsenheimeri.	......	Java.
—— phœbus............	A. malayica.	......	......	......	Malay peninsula.
—— butleri	A. scudderi..	......	......	.... .	Borneo.

Table V.—MIMETIC SPECIES IN EUPLŒINA (GROUP D).

Group D.	Group A.	Group B.	Group C.	Group E.	Locality.
Saphara ænea	Vadebra honesta.	......	......	......	Solomon Islands.
Tabada hyacintha ...	......	Bibisana diana.	......	......	Celebes.
Selinda elusine	......	......	Calliplœa mazares.	......	Java.
—— vollenhövii	......	Bibisana horsfieldii.	......	......	Celebes.
—— mneiszeckii	......	......	......	Stictoplœa gloriosa.	Celebes.
Hirdapa imitata	......	Chirosa brenchleyi.	......	......	Solomon Islands.
—— fraterna	......	C. eurypon...	......	......	Ké Island.
—— assimilata	Sariboa grayi.	C. vicina ...	......	......	Aru.
Salpinx vestigiata	......	......	......	Stictoplœa picina.	Sumatra.
—— lazulina	......	......	Calliplœa ledereri.	......	Malacca.
Isamia margarita......	Menama tavoyana.	Penoa limborgii.	......	Stictoplœa harrisii.	British Burmah.
—— ægyptus	Tronga crameri.	Andasena suluana.	......	......	N. Borneo.
—— lowei	T. brookei ...	......	......	......	Borneo.

TABLE V. (*continued*).

Group D.	Group A.	Group B.	Group C.	Group E.	Locality.
Isamia chloe	T. bremeri	Crastia distantii & C. grammifera.	......	......	Malay peninsula.
—— singapura	T. marsdeni.	......	......	......	Singapore.
—— sophia	T. moorei	......	......	......	Sumatra.
—— splendens	......	Penoa deione.	Trepsichrois linnæi ♂.	Stictoplœa binotata.	N.E. Bengal.
Pademma kollari	......	Crastia core.	......	Narmada coreoides.	India.
—— sinhala	......	C. asela	......	N. lankana	Ceylon.
—— masoni	......	Mahintha subdita.	.....	......	Tenasserim.
Nacamsa meldolæ	......	Andasena lucasii.	......	......	Mindanao.
—— simillima	......	Andasena swainsoni.	......	......	Luzon.
Tiruna rœpstorffii	......	Karadira andamanensis.	......	......	Andamans.
—— ochsenheimeri	Adigama ochsenheimeri.	......	Euplœa gyllenhalii.	......	Java.

Table VI.—MIMETIC SPECIES IN EUPLŒINA (GROUP E).

Group E.	Group A.	Group B.	Group C.	Group D.	Locality.
Doricha sylvester	Nipara helcita.	Chanapa corinna.	Calliplœa niveata.	......	New Caledonia, Australia.
—— pelor	......	Andasena eleutho.	......	......	Australia.
Stictoplœa pulla	Gamatoba nox.	......	......	......	Aru Islands.
—— immaculata	Patosa batesii.	Chirosa pierrettii.	......	......	New Guinea.
—— harrisii	Menama tavoyana.	Penoa limborgii.	......	Isamia margarita.	British Burmah.
—— binotata	......	P. deione	Trepsichrois linnæi ♂.	I. splendens.	N.E. Bengal.
—— inconspicua	......	Crastia inconspicua.	......	......	Sumatra.
—— picina	......	......	......	Salpinx vestigiata.	Sumatra.
—— tyrianthina	......	......	Tr. mulciber ♂.	......	Borneo.
—— lætifica	......	......	Calliplœa pollita.	......	Philippines.
—— gloriosa	......	......	......	Selinda mniszeckii.	Celebes.
—— doleschallii	......	Rasuma violetta.	C. jamesii.	......	New Guinea.
Narmada lankana.	......	Crastia asela.	......	Pademma sinhala.	Ceylon.
—— coreoides	......	C. core.	......	P. kollari.	India.

Table VII.—TYPICAL EXAMPLES OF THE MIMETIC SPECIES IN THE VARIOUS GROUPS OF EUPLŒINA.

Habitat.	Groups.	Structural Characters.					
		Sexual mark	Exterior margin	Posterior margin	Upper discocellular	Lower discocellular	Discocellular veinlet
	GROUP A.						
Malay peninsula.	Tronga bremeri …………	none.	uneven.	very convex.	bent.	perfect.	from upper.
	Crastia distanti …………	one on fore wing.	uneven.	convex.	bent.	perfect.	from upper.
	Isamia chloe …………	one on fore wing and patch on hind wing.	uneven.	convex.	bent.	perfect.	from upper.
	GROUP B.						
India.	Crastia core …………	one on fore wing.	uneven.	nearly straight.	bent.	perfect.	from upper.
	Pademma kollari …………	one on fore wing and patch on hind wing.	oblique.	convex.	concave.	perfect, concave.	none.
	Narmada coreoides …………	two on fore wing.	oblique.	slightly convex.	bent.	perfect.	from upper.
	GROUP C.						
N.E. India.	Trepsichrois linnæi …………	a patch on hind wing.	uneven.	slightly convex.	bent.	perfect.	from upper.
	Penoa deione …………	one on fore wing.	convex.	convex.	bent.	perfect.	from upper.
	Isamia splendens …………	one on fore wing and patch on hind wing.	oblique.	convex.	bent.	perfect.	from upper.
	Stictoplœa binotata …………	two on fore wing.	convex.	convex.	bent.	perfect.	from upper.
	GROUP D.						
British Burmah.	Isamia margarita…………	one on fore wing and patch on hind wing.	oblique. uneven.	very convex.	bent.	perfect.	from upper.
	Menama tavoyana …………	none.	uneven, oblique.	convex.	bent.	perfect.	from upper.
	Penoa limborgii …………	one on fore wing.	convex.	convex.	bent.	perfect.	from upper.
	Stictoplœa harrisii …………	*two on fore wing.*	convex.	convex.	bent.	perfect.	from upper.
	GROUP E.						
Sumatra.	Salpinx vestigiata…………	one on fore wing and patch on hind wing.	convex.	very convex.	concave.	concave, perfect.	none.
	Stictoplœa picina …………	two on fore wing.	convex.	convex.	bent.	perfect.	from upper.

Subfamily EUPLŒINÆ.

Danai festivi, Linnæus.

Festivi, Fabricius, Ent. Syst. iii. p. 39 (1793); Turton, Syst. Ent. ii. p. 54 (1806).

Limnades, Hübner, Verz. bek. Schmett. p. 14 (1816).

Danainæ[1] of modern authors.

Euplœinæ, Moore, Lep. of Ceylon, p. 1 (1880).

Fore wing with the submedian vein double at its origin. Most genera also with an incipient or lengthened discoidal veinlet emitted within the cell of fore wing. Abdomen furnished with odoriferous anal tufts of hair. Larva smooth, with fleshy processes.

Group ——?

Danaoid Heliconidæ, Bates, Trans. Linn. Soc. xxiii. pp. 496 517 (1862).

This group of Butterflies I consider to be quite distinct from the next. They differ in the form of outline in the wings, and, though having similar venation in the fore wing, the basally forked submedian, and in most of the genera the more or less lengthened discoidal (or recurrent) veinlet (in some genera two such veinlets) emitted within the cell, and, although the hind wing possesses a more or less defined small precostal (or basal) cell, this latter wing has a much larger discoidal cell, and also has (in *Lycorea halia*) a single discoidal veinlet emitted within the cell; whilst in others (*Sais rosalis* and *Mechanitis lysimnia*) the costal and subcostal veins are amalgamated, and consequently the precostal cell is absent, and the discoidal veinlet within the cell is present; but in the former species (*Sais*) there are two such veinlets in both wings of the female, and two in fore wing of female *M. lysimnia*. In *Ithomia* (sp.?) the costal and subcostal veins of the hind wing run close together from their base along edge of the margin, both wings also having a short discoidal veinlet emitted within the cell. In this group, the males, besides possessing odoriferous tufts of hair at the extremity of the abdomen, have in some genera an odoriferous tuft of hair also on the subcostal vein along the upper side of the hind wing[2].

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[1] Linnæus used the name *Danaus* in both sections of his Papilio Danai (*D. candidi* and *D. festivi*). In 1777 Esper (Die Schmett. i. p. 53) used it as a generic name for species of Pierinæ, representing Linnæus's *D. candidi*; and in 1784 Esper (Natur. des Linneischen Systems, p. 214) again cites it for species of Pierinæ. Fabricius (Ent. Syst. iii. p. 39, 1793) and Weber (Nomen. Ent. pp. 99, 106, 1795) separated the modern Danainæ under the name of *Festivi*, and restricted the term *Danai* to the *D. candidi* of Linnæus. In 1798 Cuvier (Tableau Elément. d'Hist. Nat. p. 590) cites species of Pierinæ only under *Danai*. Panzer, in 1801 (Faun. Ins. Germ. Hefte 73–84, p. 11), also adopts *Danaus*, generically, for species of Pierinæ; and, in 1806, Turton (Gen. Syst. of Entom. p. 64) also restricts the *Danai* to species of Pierinæ. The name "*Danaus*," as applied by Latreille in 1805–09, cannot, therefore, be retained in this group of Butterflies.

[2] See Fritz Muller's "Notes on Brazilian Entomology" (Trans. Ent. Soc. 1878, p. 211), and translation by R. Meldola of Dr. Fritz Müller's paper on *Ituna* and *Thyridia*, in Trans. Ent. Soc. 1879, 'Proceedings,' p. xx.

I have not attempted the study of this group of American Butterflies further than what was necessary for the purpose of pointing out its distinction from the other groups.

Group LIMNAINA.

Males, in most genera, possessed with one or more glandular sacs or scent-producing organs on the hind wing. Hind wing also mostly with a more or less defined precostal cell. Abdomen furnished with odoriferous anal tufts of hair.

Larva smooth, with two or more pairs of subdorsal, long, slender, fleshy processes.

KEY TO THE GENERA OF LIMNAINA.

A.	*No "sexual mark" or scent-producing organ on hind wing.*				
	Sexual mark on hind wing	Upper discocellular vein of fore wing	Lower discocellular vein of fore wing	Discoidal veinlet of fore wing	Typical genera and species.
	none.	bent.	perfect.	from upper discocellular, very short.	Hestia lynceus.
	none.	ditto.	ditto.	ditto.	Nectaria idea.
	none.	ditto.	ditto.	ditto, short.	Gamana daos.
	none.	ditto.	ditto.	ditto.	Ideopsis gaura.
	none.	ditto.	imperfect at upper end.	ditto.	Radena similis.
	none.	concave.	perfect, concave	none.	Cadytis vashti.
B.	*One "sexual mark" or scent-producing organ on hind wing.*				
a.	On submedian vein.	concave.	imperfect at upper end.	none.	Amauris niavius.
	ditto.	ditto.	ditto.	ditto.	Nebroda echeria.
	ditto.	ditto.	ditto.	ditto.	Berethis phædon.
	ditto.	ditto.	ditto.	ditto.	Lintorata menadensis.
b.	Between median and submedian veins.	straight.	bent, imperfect near upper end.	from lower discocellular, short.	Tirumala limniace.
	ditto.	ditto.	straight, imperfect at upper end	from middle of discocellulars, short.	Nasuma ismare.
	ditto.	ditto.	ditto.	ditto.	Melinda formosa.
	ditto.	bent.	imperfect.	from upper discellular.	Anosia plexippus.
	ditto.	straight.	straight, imperfect.	from middle of discocellulars, short.	Tasitia berenice.
	ditto.	ditto.	ditto.	ditto.	Limnas chrysippus.
	ditto.	bent.	ditto.	from upper discocellular, short.	Salatura genutia.

KEY TO THE GENERA OF LIMNAINA (*continued*).

C.	*Two "sexual marks" or scent-producing organs on hind wing.*				
	Sexual mark on hind wing	Upper discocellular vein of fore wing	Lower discocellular vein of fore wing	Discoidal veinlet of fore wing	Typical genera and species.
a.	On median and submedian vein.	straight.	bent, imperfect near upper end.	from lower discocellular, short.	Ravadeba cleona.
	ditto.	ditto.	ditto.	ditto.	Bahora philomela.
	ditto.	ditto.	ditto.	ditto.	Phirdana pumila.
	ditto.	ditto.	ditto.	ditto.	Asthipa vitrina.
	ditto.	ditto.	ditto.	ditto.	Parantica aglea.
	ditto.	ditto.	ditto.	ditto.	Mangalisa albata.
b.	On submedian and internal veins.	ditto.	ditto.	ditto.	Caduga tytia.
	ditto.	ditto.	ditto.	ditto.	Chittira fumata.

A. *No "sexual mark" or scent-producing organ on hind wing.*

Genus NECTARIA.

Nectaria, Dalmann, in Billb. Enum. Ins. p. 76 (1820); Moore, Lep. of Ceylon, i. p. 2 (1880).

Idea, Fabricius, Illiger's Mag. vi. p. 283 (1807); Godart, Enc. Méth. ix. p. 194 (1819).

Danaus (part.), Latreille, Gen. Crust. et Ins. iv. p. 201 (1809); Consid. Gén. C. et Ins. pp. 352, 440 (1810).

Hestia (part.), Hübner, Verz. bek. Schmett. p. 15 (1816).

Hestia, Doubleday & Hewits. Gen. D. Lep. p. 94; Distant, Rhop. Malayana, p. 5.

Wings semidiaphanous, large: fore wing broad, lengthened, triangular; costa slightly arched, apex quite convex, exterior margin oblique, waved, posterior margin short, slightly concave in middle; costal vein extending to half its length; first subcostal branch emitted at about one fourth before end of the cell and anastomosed to costal near its end, second branch from near end of the cell, third and fourth at equal distances beyond, the fourth terminating above and the fifth below the apex; cell long; upper discocellular inwardly oblique, bent near subcostal and in the middle, the lower angle produced to a point within the cell, lower discocellular outwardly convex, first radial from upper angle and second from below lower angle of upper discocellular; three median branches wide apart; submedian very recurved, basal veinlet short, slender. Hind wing lengthened, oval; costal margin slightly waved, anal angle convex; cell broad; costal vein short, precostal forked; subcostal branches wide apart, first very short; discocellulars bent outward at their middle, the radial emitted from the angle; median branches wide apart; submedian and internal vein slightly recurved. Body long, slender; palpi porrect, pilose above and beneath, tip pointed, very minute; legs long, slender; antennæ slender.

Larva (*N. malabarica*) with four pairs of long fleshy filaments.

Type *N. idea*.

1. NECTARIA IDEA.

Papilio idea, Clerck, Icones, ii. pl. 38. f. 1, ♂ (1764); Joh. Amœn. Acad. vi. p. 405; Linn. Mus. Ulr. p. 238; id. Syst. Nat. i. 2, p. 758 (1767); Cram. Pap. Exot. iii. pl. 193. f. A, B, ♀; Donov. Ins. Ind. pl. 24.

Idea idea, Fabr. Syst. Glossat., Illiger's Mag. vi. p. 120 (1808).

Danaus idea, Latr. Gen. Crust. et Ins. iv. p. 201 (1809); Consid. Gén. Crust. et Ins. p. 440 (1810).

Limnas (Thalassica) idea, Hübner, Samml. exot. Schmett. i. pl. 18 (1806).

Hestia idea, Hübn. Verz. bek. Schmitt. p. 15; Butler, Trans. Ent. Soc. 1867, p. 467; Aurivillius, Kongl. Vet.-Akad. Handl. 1882, p. 52.

Hab. Ceram, Amboina (*Wallace*).

2. NECTARIA AZA.

Idea aza, Boisduval, Voy. Astr., Lép. p. 106 (1832).

Papilio idea, Cramer, Pap. Exot. iv. pl. 362. f. D, ♀.

Hestia aza, Butler, Trans. Ent. Soc. 1867, p. 468.

Hab. Bouru; Sula Is. (*Wallace*).

3. NECTARIA AGELIA.

Idea agelia, Godart, Enc. Méth. ix. p. 195 (1819); Lucas, Lép. Exot. pl. 48. ♀.

Hab. Batchian (*Wallace*). In coll. H. G. Smith.

4. NECTARIA D'URVILLEI.

Idea d'urvillei, Boisduval, Voy. Astr., Lép. p. 107, pl. 3. f. 4 (1832).

Hestia d'urvillei, Doubleday & Hewits. Gen. D. Lep. pl. 13. f. 3, ♂; Butler, Trans. Ent. Soc. 1867, p. 469.

Hab. Aru; New Guinea.

The New-Guinea form has darker wings, the veins and all the markings being more prominent.

5. NECTARIA BLANCHARDII.

Idea blanchardii, Marchal, Rev. Zool. 1845, p. 168, ♂.

Hestia blanchardii, Butler, Trans. Ent. Soc. 1867, p. 468.

Idea tondana, Vollenhoven, Tijd. voor Ent. iii. p. 41, pl. 4 (1860).

Hab. Borneo (*Marchal*); Celebes (*Brit. Mus.*).

6. NECTARIA LEUCONOE.

Idea leuconoë, Erichson, Nova Acta Acad. Nat.-Cur. xvi. p. 283 (1834).

Hestia leuconoë, Doubleday & Hewitson, Gen. D. Lep. p. 95 pl. 13. f. 2 (1847); Butler, Trans. Ent. Soc. 1867, p. 469.

Hab. Philippines (Mindanao); Borneo.

7. NECTARIA GODMANI.

Idæa godmani, Oberthür, Trans. Ent. Soc. Lond. 1879, p. 230.

Hab. Sangir Island.

8. NECTARIA CLARA.

Hestia clara, Butler, Trans. Ent. Soc. 1867, p. 469.

Hab. Tamsui, North Formosa (*Hobson*); ? Java; Billiton.

SABALASSA, n. g.

Fore wing in both sexes much produced and rounded at the apex; exterior margin very oblique, and in the male very abruptly concave in the middle, thus giving a different shape to this wing, as compared with *Nectaria* (*Idea*), though approaching that of *Hestia*. In pattern of markings it similates to *Nectaria*.

SABALASSA ELECTRA.

Hestia electra, Semper, Verh. Ver. Nat. Unt. Hamburg, iii. p. 106 (1878).

Male and female. Yellowish: fore wing much produced and rounded at the apex; veins and cell-streaks black; a black, irregular, angulated patch in middle of the cell and a broad lunular patch at its end; a narrow, waved-bordered, marginal band traversed by a row of yellowish spots; a discal transverse zigzag band, a small spot below the cell between middle and lower medians, and a pyriform spot between median and submedian. Hind wing with black veins and cell-streaks; a waved-bordered marginal band traversed by yellowish spots, a discal series of sagittate marks, the lower marks being slightly confluent with the veins at their upper angles.

Expanse, ♂ 5¼, ♀ 6½.

Hab. Philippines (East Mindanao). In coll. G. Semper.

Genus HESTIA.

Hestia, Hübner, Verz. bek. Schmett. p. 15 (1816).

Wings semidiaphanous: fore wing long, narrow, somewhat fusiform; costa much arched; cell narrow; first subcostal vein emitted at one fifth before end of the cell, and joined to costal near its end by a short cross branch; upper discocellular inwardly oblique, deeply concave in the middle, lower curved outward; upper radial from near subcostal, lower radial from below the angle in the middle of discocellulars; submedian with a short, slender, lower basal veinlet. Hind wing fusiform, narrow; cell narrow; veins mostly straight. Antennæ slender; apical joint of palpi prominent.

Type *H. lynceus*.

1. HESTIA LYNCEUS.

Papilio lynceus, Drury, Ill. Exot. Ent. ii. pl. 7. f. 1 (1773).

Idea lyncea, Godt. Enc. Méth. ix. p. 195.
Hestia lynceus, Hübner, Verz. bek. Schmett. p. 15 (1816).
Hab. Borneo. In colls. British Museum and F. Moore.

2. HESTIA STOLLI.

Papilio idea, Stoll, Cramer's Pap. Exot. v. pl. 42. f. 1.

Intermediate between *H. reinwardtii* and *H. lynceus*. Wings comparatively shorter and narrower, the tint of ground-colour whitish, the veins broader black-lined than in *H. lynceus*; the discal spots and marginal markings are also broader than in *H. lynceus*; but neither the veins nor markings are so large and prominent as in *H. reinwardtii*.

Expanse, ♂ 6, ♀ 6¼ inches.
Hab. Java. In colls. British Museum and F. Moore.

3. HESTIA REINWARDTI.

Hestia lynceus, Distant, Rhop. Malayana, pl. 1. f. 2, ♂ (1882).

Male and female. Differs from the Bornean *H. lynceus* in both wings being a quarter of an inch broader, as measured across the middle; the fore wing is also shorter; the hind wing much shorter, being considerably less produced externally, and the abdominal margin longer; the wings are very conspicuously blacker in tint; the veins in both wings are broader, and with the spots are of a deeper black and stand out more prominently, the spots being similar but larger.

Expanse, ♂, ♀ 6¼ inches.
Hab. Sumatra; Nias; Malacca. In colls. British Museum, H. G. Smith, and W. L. Distant.

4. HESTIA LOGANI.

Hestia lynceus (part.), Distant, Rhop. Malayana, p. 6 (1882).

Differs from *H. reinwardti* in both sexes having the wings comparatively narrower, the hind wing being more produced exteriorly; the ground-colour is also much paler and of a slight brownish fuliginous tint; all the veins are slenderly black-lined, the spots and border-markings being about one half less in size.

Expanse, ♂ 6¼, ♀ 6½ inches.
Hab. Malacca; Penang. In coll. British Museum.

5. HESTIA DONOVANI, n. sp.

Compared with typical Bornean *H. lynceus*, this is paler in colour, the black veins narrower; markings similar, but all of half the size: fore wing with the cell-spot more quadrate, the discocellular angular spot very broad hindward, the discal series more rounded, the basal spot below the cell cordate, the marginal marks short. Hind wing with the cell and discal spot small and round, the basal spot below the cell crossed by the black streak.

Expanse, ♀ 4½ inches.
Hab. Singapore. In coll. H. G. Smith.

6. **Hestia druryi**, n. sp.

Hestia idea, var., Doubleday & Hewitson, D. Lep. pl. 13. f. 1, ♂.

Nearest to *H. loganii*. Wings smaller; the veins more slenderly and less distinctly black-lined; all the spots much smaller; fore wing with the cell-spot triangular, the discocellular streak narrow, the discal row of spots more conical; the basal spot below the cell is broken into two smaller spots by the separating pale longitudinal streak; the marginal series of marks are comparatively longer and of less breadth. Hind wing with the cell-spot half the size, the discal series more conical; the basal spot below the cell is single and has no contiguous small spot below the slender streak, the marginal marks comparatively narrower.

Expanse $5\frac{1}{2}$ inches.

Hab. Sumatra. In colls. British Museum and F. Moore.

7. **Hestia jasonia.**

Hestia jasonia, Westwood, Cabinet of Oriental Entom. p. 87, pl. 43. f. 1 (1848); Butler, Trans. Ent. Soc. 1867, p. 470.

Nectaria jasonia, Moore, Lep. of Ceylon, p. 3, pl. 1. f. 1 (1880); Marshall & de Nicéville, Butt. of India &c. p. 27, pl. 3. f. 1, ♂.

Hab. Ceylon.

The specimens of *H. jasonia* are very variable in the tint of the ground-colour of their wings, some being almost greyish white, others dusky white, whilst some are fuliginous brown. The form of wings and pattern of markings in these differently coloured specimens do not vary to any appreciable extent. These differences in coloration may be the result of seasonal broods, of which probably there are two or more, as, according to Capt. Hutchison, this insect may be found on the wing all the year in the Western, Central, and Southern Provinces of the island.

8. **Hestia agamarschana.**

Hestia agamarschana, Felder, Reise der Novara, Lep. ii. p. 351, pl. 43. f. 7 (1867); Butler, Trans. Ent. Soc. 1867, p. 470; Moore, P. Z. S. 1877, p. 582; Marshall & de Nicéville, Butt. of India &c. p. 27 (1882).

Hab. Andaman Isles.

9. **Hestia cadelli.**

Hester cadellii, W. Mason, Journ. Asiatic Soc. Bengal, 1880, p. 225, pl. 13. f. 1, ♂, 1881, p. 244, ♀; Marshall & de Nicéville, Butt. of India &c. p. 28, pl. 4. f. 2, ♂ (1882).

Hab. Andaman Isles.

10. **Hestia hadeni.**

Hestia hadeni, W. Mason, Journ. Asiatic Soc. Bengal, 1880, p. 242, pl. 13. f. 2, ♀; Marshall & de Nicéville, Butt. of India &c. p. 29, pl. 4. f. 3, ♀.

Hab. Bassein, British Burmah.

11. HESTIA LINTEATA.

Hestia linteata, Butler, Trans. Linn. Soc. 2 ser. i. p. 536, pl. 69. f. 6 (1876–79); Distant, Rhopal. Malayana, p. 7, pl. 2. f. 1 (1882).

Hab. Malay Peninsula (Province Wellesley, Malacca).

12. HESTIA MALABARICA.

Hestia malabarica, Moore, Ann. Nat. Hist. ser. 4, vol. xx. p. 46 (1877).

Hestia malabaricus et *lynceus*?, Marshall & de Nicéville, Butt. of India &c. pp. 25, 26 (1882).

Hab. S.W. India (Western Ghauts, Nilgiris, Travancore). In colls. F. Moore and British Museum.

The larva and pupa of *H. malabarica* were figured in the Catal. Lep. Mus. E.I. Co. pl. iv. f. 11, 11*a*, in error for those of *G. daos*. The figures there engraved were stated by Prof. Westwood to represent the transformations of *G. daos*; the drawings (now in the Library of the Entomological Society of London) were received by him from Capt. Hamilton; and the species in question was stated to be from the Tenasserim coast.

In a letter which I subsequently received from Mrs. Hamilton, this lady informed me that the drawings of the above-mentioned larva and pupa were made from specimens taken on the Cotiaddy Pass, in the Western Ghauts of Southern India, not in Tenasserim as stated by Prof. Westwood. This identity is also confirmed by other drawings of the metamorphoses of the same insect, now in my possession.

13. HESTIA BELIA.

Hestia belia, Westwood, Cabinet of Oriental Entom. p. 75, pl. 37. f. 2 (1848); Moore, Catal. Lep. Mus. E.I. Co. i. p. 135, pl. 4. f. 12; Butler, Trans. Ent. Soc. 1867, p. 470.

Hab. Java.

14. HESTIA HYPERMNESTRA.

Hestia hypermnestra, Westwood, Cabinet of Oriental Entom. p. 75, pl. 37. f. 1 (1848).

Idea hypermnestra (*jasonia*, var.), Vollenhoven, Tijds. voor Entom. iii. p. 43, pl. 3 (1860), ♂.

Hab. Borneo.

GAMANA, n. g.

Wings semidiaphanous: fore wing long, narrow, somewhat fusiform; costa arched at base and apex; first subcostal vein emitted as a short branch obliquely up to costal at about one third before end of the cell, and terminating beyond its end; upper discocellular angled inward near its lower end and producing a short discoidal spur within the cell from the angle, lower discocellular outwardly oblique; first radial emitted from below subcostal at some distance beyond end of the cell, second from near angle of upper discocellular. Hind wing short, broad, oval, very convex externally; cell short;

costal vein long, extending to posterior angle of fore wing; first and second subcostal veins long. Antennæ short, slender, with a well-formed rounded club. Apical joint of palpi prominent.

1. Gamana daos.

Idea daos, Boisduval, Spec. Gén., Lép. i. pl. 24. f. 3 (1836), ♂.
Hestia eudora, Gray, Lep. Ins. Nepal, p. 10, pl. 9. f. 3 (1846), ♂.
Idea diardi, Voll. Tijd. voor Ent. iii. p. 44, pl. 2. f. 4 (1860), ♂.
Ideopsis daos, Moore, Catal. Lep. Mus. E.I. Co. i. p. 134 (1857); Distant, Rhopal. Malayana, p. 8, pl. i. f. 3, 4, ♂ ♀ (1882).

Hab. Malay peninsula (Province Wellesley, Malacca); Penang; Singapore; Sumatra; Borneo.

2. Gamana costalis, n. sp.

Male. Smaller than Malayan specimens; veins of both wings conspicuously narrower, not being black-bordered at their base. On the fore wing the costal border is blacker, being completely covered basally; the discocellular spot and the submarginal and marginal spots are of half the size of those in Malayan specimens: hind wing with the discocellular, submarginal, and marginal spots also about half the size.

Expanse, ♂ 3¼ inches.

Hab. Nias Island, W. coast of Sumatra. In coll. British Museum.

A Sumatran female in the British Museum, and another in my collection, which may possibly belong to this species, are both smaller and darker, and have the veins more broadly black-bordered than Malayan females of *G. daos*.

Genus Ideopsis.

Ideopsis, Horsf. & Moore, Catal. Lep. E.I. Co. i. p. 133 (1857).
Danais, sect. 4, Doubleday, Gen. D. Lep. p. 90.

Wings semidiaphanous: fore wing narrow, triangular; costa in male slightly arched; first subcostal branch emitted at about one third before end of the cell and anastomosed to costal, second at some distance before end of the cell: upper discocellular bent inward near its lower end and producing a short discoidal spur within the cell from the angle, lower discocellular outwardly oblique; first radial emitted from below the subcostal at some distance beyond end of the cell, second radial from near angle of the upper discocellular. Hind wing bluntly oval; costal margin long, nearly straight; abdominal margin long; venation similar to *Gamana*. Antennæ with a short, broad, flat, spatular club. Apical joint of palpi pointed.

Type *I. gaura*.

1. Ideopsis gaura.

Idea gaura, Horsfield, Catal. Lep. E.I. Co. (1829), pl. 6. f. 1: Boisd. Spec. Gén. Lép., i. pl. 11. f. 11 (1836).

Hab. Java.

2. IDEOPSIS GLAPHYRA, n. sp.

Ideopsis glaphyra, Semper, MS.

Intermediate between *I. gaura* and *I. anapis*.

Male. Fore wing differs from *I. anapis* in the three pale streaks between subcostals and upper median being interrupted with black, the excavated streak between upper and middle median extending to the base of the interspace, in the same manner as the two lower pale interspaces. Hind wing with similar spots, the black discal spots being joined to the marginal band by short streaks; a black spot at end of the cell.

Female. Fore wing with broader and larger entire upper pale streaks, extending to base of the interspaces. Hind wing with the discal spots as in male, the cell-spot being obsolete.

Expanse, ♂ 3, ♀ 3$\frac{3}{8}$ inches.

Hab. Philippines (Mindanao). In coll. G. Semper.

3. IDEOPSIS ANAPIS.

Danais anapis, Felder, Wien. ent. Monats. v. p. 300 (1861).

Ideopsis anapis, Felder, Reise der Novara, Lep. ii. p. 351, pl. 43. f. 6 (1867).

Hab. Philippines (Luzon).

4. IDEOPSIS HEWITSONI.

Ideopsis hewitsonii, Kirsch, Mitth. zool. Mus. Dresden, i. p. 114, pl. 6. f. 1 (1877), ♂.

Hab. New Guinea (Mysore Island).

5. IDEOPSIS VITREA.

Danais vitrea, Blanchard, Voy. Pôle Sud, p. 385, pl. 2. f. 2 (1853), ♀.

Danais œnopia, Felder, Wien. ent. Monats. iii. p. 182, pl. 4. f. 2 (1859).

Hab. Celebes.

6. IDEOPSIS CHLORIS.

Danais chloris, Felder, Wien. ent. Monats. iv. p. 231 (1860); id. Reise der Novara, Lep. ii. p. 351, pl. 42. f. 3, ♂ (1867).

Danais salvini, Butler, P. Z. S. 1866, p. 172, f. 2, ♀.

Hab. Moluccas; Gilolo, Batchian; Celebes.

7. IDEOPSIS INUNCTA.

Danais inuncta, Butler, P. Z. S. 1865, p. 481, ♀, 1866, pl. 4. f. 7, ♀.

Ideopsis phæstis, Felder, Reise der Novara, Lep. ii. p. 351, pl. 43 f. 5 (1867), ♀.

Hab. Waigiou.

Genus Radena.

Radena, Moore, Lep. of Ceylon, i. p. 3 (1880); Distant, Rhopal. Malayana, p. 9 (1882).

Danaus (part.), Latreille, Gen. Crust. et Ins. iv. p. 201 (1809).

Hestia (part.), Hübner, Verz. bek. Schmett. p. 15 (1816).

Danais (*Radena*), Marshall & de Nicéville, Butt. of India, Burmah, &c. p. 32 (1882).

Fore wing moderately long, triangular; first subcostal branch emitted at about one third before end of the cell and anastomosed to the costal in the middle, second branch emitted immediately before end of the cell, third and fourth at equal distances beyond; discocellulars concave, upper slightly bent before the middle, producing a very short discoidal spur within the cell from the angle, lower discocellular slender at its upper end; upper radial from end of cell, in a line with subcostal, lower from the middle; medians at equal distances apart; submedian with a short, slender, lower basal veinlet. Hind wing broad, somewhat triangular; costal margin long, nearly straight, abdominal margin long; costal vein very convex from the base and then extending straight along edge of the margin; cell long, broad; subcostals and median branches very wide apart. No scent-pouch in male. Antennæ longer than in allied genera, and with a more gradually thickened and blunt club. Apical joint of palpi long.

Larva (*R. juventa*) with two pairs of fleshy filaments.

Type *R. similis*.

1. **Radena similis.**

Papilio similis, Linn. Mus. Ulr. p. 299; id. Syst. Nat. x. p. 479 (1758); Clerck, Icones, i. pl. 16. f. 3 (1759); Fabr. Ent. Syst. iii. p. 58.

Danais similis, Butler, Catal. Lep. Fabr. Brit. Mus. p. 6.

Danais similis, Aurivillius, Kongl. Vet.-Akad. Handl. 1882, p. 100.

Papilio aventina, Cramer, Pap. Exot. i. pl. 59. f. F (1779).

Danais aventina, Godt. Enc. Méth. ix. p. 191.

Danais chinensis, Felder, Verh. zool.-bot. Gesellsch. xii. p. 488 (1862).

Hab. Hongkong; Formosa.

2. **Radena persimilis.** (Plate XXXI. fig. 4.)

Danais persimilis, Moore, Proc. Zool. Soc. 1879, p. 136.

Hab. Siam (Bankok). In coll. F. Moore.

3. **Radena vulgaris.**

Danais vulgaris, Butler, Entom. Monthly Mag. xi. p. 164 (1874) Moore, Proc. Zool. Soc. 1878, p. 822.

Radena vulgaris, Distant, Rhopalocera Malayana, p. 10, pl. 1. f. 8 (1882).

Danais (*Radena*) *vulgaris*, Marshall & de Nicéville, Butt. of India &c. p. 32, fig. ♂ ♀ (1882).

Euplœa similis, Zinken-Sommer, Nova Acta Acad. Cur. 1831, p. 175.

Hab. British Burmah (Tenasserim); Malay peninsula (Prov. Wellesley, Malacca); Penang; Sumatra; Java (*Horsfield*); Billiton; Borneo (Sarawak, Banjermassen).

4. RADENA NICOBARICA.

Danais similis, var. *nicobarica*, Wood-Mason, Journ. Asiat. Soc. Bengal, 1881, p. 225, 1882, p. 14.

Danais (*Radena*) *nicobarica*, Marshall & de Nicéville, Butt. of India &c. p. 34, fig. ♀.

Hab. Great Nicobars.

5. RADENA EXPROMPTA.

Danais exprompta, Butler, Entom. Monthly Mag. xi. p. 164 (1874).

Radena exprompta, Moore, Lep. of Ceylon, i. p. 4, pl. 2. f. 1 (1880).

Danais (*Radena*) *exprompta*, Marshall & de Nicéville, Butt. of India &c. p. 33 (1882).

Hab. Ceylon.

6. RADENA JUVENTA. (Plate XXIX. fig. 1, ♂.)

Papilio juventa, Cramer, Pap. Exot. ii. pl. 188. f. B (1780).

Danais juventa, Godt. Enc. Méth. ix. p. 193; Moore, Catal. Lep. Mus. E.I. Co. i. p. 122, pl. 4. f. 4, 4*a*.

Hab. Java, Lombock, Billiton.

7. RADENA MANILLANA, n. sp.

Male. From typical specimens of *R. juventa* this differs on the fore wing in the discoidal streaks being nearer together, and in some touching at their lower end; the medial discal spots are more oval in shape. On the hind wing the discal spots are also comparatively narrower and longer, and the two marginal series of spots are disposed in a more curved series.

Female. With more widely separated markings, the medial discal spots conspicuously oval, and the submarginal row composed of larger spots: the hind wing has much narrower streaks and comparatively larger marginal spots.

Expanse 3 inches.

Hab. Manilla, South Luzon. In coll. F. Moore and G. Semper.

8. RADENA LUZONICA, n. sp.

Intermediate between *R. juventa* and *R. ishma.* Fore wing with all the markings smaller and more widely separated than in *R. ishma*, the second and third upper discal and the two opposite submarginal spots separated as in *R. juventa*, the two large discal smaller than in either of those species, the two bands between the median and submedian well separated in the female; the submarginal spots are comparatively larger than in *R. juventa*. Hind wing with widely separated basal markings as in *R. ishma*, the two marginal rows of spots less distinct than in *R. juventa*.

Expanse, ♂ 3¼, ♀ 3 inches.

Hab. North Luzon. In coll. F. Moore, G. Semper, and British Museum.

9. **Radena ishma.**

Danais ishma, Butler, Cist. Entom. i. p. 2 (1869); id. Lep. Exot. i. p. 53, pl. 20. f. 3 (1871), ♂.

Hab. Gilolo, Celebes.

10. **Radena meganira.**

Danais meganira, Godt. Enc. Méth. ix. p. 192 (1819); Boisd. Faune de l'Océanie, ix. p. 104; Blanch. Voy. Pôle Sud, p. 387, pl. 2. f. 4, ♀,

? *Papilio claviger*, Gmelin, Syst. Nat. i. 5. p. 2289 (1788–93); Zschach, Mus. Lesk. Ent. p. 89 (1788).

Hab. Ceram.

11. **Radena curtisi**, n. sp.

Allied to *R. sobrinoides*. Fore wing with a very slender, long, basal, discoidal streak; a smaller irregular constricted spot at the end, the two upper discal series of spots much smaller, the two streaks below the cell narrower. Hind wing with similar basal interspaces; the discoidal more entire and its bifid streak defined; the two marginal rows of spots much smaller.

Expanse, ♂ $2\frac{3}{10}$, ♀ 3 inches.

Hab. Batchian (*Curtis*). In coll. British Museum.

12. **Radena sobrina.**

Danais sobrina, Boisduval, Faune de l'Océanie, ix. p. 103, pl. 4. f. 3 (1832).

Hab. New Guinea, Aru.

13. **Radena purpurata.**

Danais purpurata, Butler, P. Z. S. 1866, p. 52. f. 2; Kirsch, Mitth. Zool. Mus. Dresden, i. p. 114 (1877).

Hab. New Guinea.

14. **Radena turneri.**

Danais turneri, Butler, Ann. Nat. Hist. ser. 5, vol. i. p. 480 (1878).

Hab. New Guinea, Thursday Island.

15. **Radena sobrinoides.**

Danais sobrinoides, Butler, Ann. Nat. Hist. ser. 5, vol. x. p. 37 (1882).

Hab. New Britain; New Ireland.

CADYTIS, n. g.

Fore wing more triangular than in *Amauris*, the costal margin straighter; cell narrower; discocellulars less obliquely convex, lower discocellular slender at upper end; no discoidal spur. Hind wing slightly produced at the apex, exterior margin somewhat straight anteriorly and convex posteriorly, abdominal margin very long. *Male*: hind wing with the area on both sides of the submedian vein numerously covered with fine long hairs.

CADYTIS VASHTI.

Danais vashti, Butler, Cist. Ent. i. p. 1 (1869).
Amauris vashti, Butler, Lep. Exot. i. pl. 21. f. 1 (1871).
Hab. Old Calabar.

B. *One "sexual mark" or scent-producing organ on hind wing.*

a. Sexual mark on submedian vein.

Genus AMAURIS.

Amauris, Hübner, Verz. bek. Schmett. p. 14 (1816); Reakirt, Proc. Acad. Nat. Sci. Phil. 1866, p. 240.
Danais (sect. i.), Doubleday, Gen. D. Lep. p. 89; Butler, P. Z. S. 1866, p. 43.

Fore wing long, narrow, triangular, apex convex, exterior margin very oblique, posterior margin straight; subcostal vein straight, first branch emitted at one fourth before, and second branch close to, end of the cell, second extending to near apex; third branch trifid; cell long, narrow; discocellulars obliquely concave, upper longest, lower slender at upper end; upper radial emitted from end of the cell; submedian vein undulated, emitting a short slender veinlet from below near the base. Hind wing broadly conical; costal margin nearly straight, exterior margin convex, abdominal margin long; costal vein much curved at base and extending along edge of the margin; first subcostal emitted at half length of the cell, much curved, second branch quite straight; cell broad; discocellulars very oblique. Male with a lengthened oval glandular patch or scent-producing organ on the submedian vein near its end, where the vein is also slightly swollen; abdomen with a pair of large flat conchiform anal claspers, from above which are exserted a pair of large pencils of hair. Antennæ long with moderately well-formed club. Palpi ascending to vertex, flattened; first and second joints pilose beneath; third joint rather long, projected forward in front of the head, squamose. Legs long, slender.
Type *A. niavius.*

1. AMAURIS NIAVIUS.

Papilio niavius, Linn. Mus. Ulr. p. 253 (1764); id. Syst. Nat. i. 2, p. 766 (1767); Clerck, Icon. ii. pl. 32. f. 2 (1764); Cramer, Pap. Exot. ii. pl. 2. f. F, G; Beauvois, Ins. Afr. et Am., Lép. p. 238, pl. 6. f. 1*a*, 1*b*.

Amauris niavius, Hübner, Verz. bek. Schmett. p. 15; Aurivillius, Kongl. Vet.-Akad. Handl. 1882, p. 63.

Danais niavius, Godart, Enc. Méth. ix. p. 182; Butler, Catal. Lep. Fabr. B. M. p. 4.

Hab. Sierra Leone; Ashanti; Angola.

2. AMAURIS DOMINICANA.

Danais dominicanus, Trimen, Trans. Ent Soc. 1879, p. 323.

Danais niavius, var., Trimen, Trans. Linn. Soc. xxvi. pp. 511, 521, pl. 42. f. 6, ♂.

Hab. Natal.

3. AMAURIS DAMOCLES.

Papilio damocles, Beauvois, Ins. Afr. et Am., Lép. p. 239, pl. 6. f. 3*a*, *b* (1805).

Danais damocles, Godart, Enc. Méth. ix. p. 182.

Hab. Sierra Leone; Angola.

4. AMAURIS HECATE.

Danais hecate, Butler, P. Z. S. 1866, p. 44.

Euplœa niavius, Doubleday & Hewits. Gen. D. Lep. pl. 11. f. 3.

Hab. Ashanti.

5. AMAURIS INFERNA.

Amauris inferna, Butler, P. Z. S. 1871, p. 79; id. Lep. Exot. p. 86, pl. 33. f. 2 (1872).

Hab. Inbonzo.

6. AMAURIS TARTAREA.

Amauris tartarea, Mabille, Bull. Soc. Zool. France, 1876, p. 199.

Hab. Congo.

7. AMAURIS HYALITES.

Amauris hyalites, Butler, Cistula Ent. i. p. 209 (1874).

Hab. Ambriz.

8. AMAURIS EGIALEA.

Papilio egialea, Cramer, Pap. Exot. ii. pl. 192. f. D (1779).

Amauris egialea, Hübner, Verz. bek. Schmett. p. 14.

Danais egialea, Butler, Catal. Fabr. Lep. B. M. p. 4; Trimen, Trans. Linn. Soc. xxvi. p. 506.

Papilio damocles, Fabricius, Spec. Ins. p. 102 (1781); id. Ent. Syst. iii. 1, p. 41 (1793).

Hab. Sierra Leone; Cape Palmas; Ashantee.

9. AMAURIS GABUNICA.

Amauris damocles, var. *gabunica*, Aurivillius, Ent. Tidskr. ii. p. 39 (1881).

Hab. Gaboon.

10. AMAURIS NOSSIMA.

Danais nossima, Ward, Ent. Monthly Mag. vi. p. 225 (1870); Afr. Lep. p. 5, pl. 5. f. 1 (1873).

Hab. Madagascar.

11. AMAURIS OCHLEA.

Danais ochlea, Boisduval, Voy. Deleg. ii. p. 589 (1847); Trimen, Rhop. Afr. Austr. p. 85, pl. 2. f. 6.

Amauris ochlea, Reakirt, Proc. Acad. Sci. Phil. 1866, p. 241.

Hab. Natal.

NEBRODA, n. g.

Fore wing comparatively shorter and more regularly triangular than in *Amauris*; costa straighter, first subcostal branch emitted nearer end of the cell; discocellulars shorter; cell narrower at end. Hind wing shorter, the apex and exterior margin more convex; cell less triangular; first and second subcostal branches emitted much further apart. Male with a small, prominent, short oval glandular patch or scent-producing organ near end of submedian vein. Abdomen shorter; anal conchiform valves prominent. Antennæ stouter.

"Larva with five pairs of rather long fleshy filaments" (*Trimen*).

Type *N. echeria.*

1. NEBRODA ECHERIA.

Papilio echeria, Stoll, Suppl. Cram. Pap. Exot. pl. 29. f. 2, 2 *b* (1790).

Amauris echeria, Hübner, Verz. bek. Schmett. p. 14.

Danais echeria, Trimen, Rhop. Afr. Austr. i. p. 86; Trans. Linn. Soc. xxvi. p. 506, pl. 42. f. 3.

Danais vuillantiana, Godart, Enc. Méth. ix. p. 183 (1819).

Hab. South Africa (Cape colony).

2. NEBRODA ALBIMACULATA.

Amauris albimaculata, Butler, Ann. Nat. Hist. ser. 4, vol. xvi. 1875, p. 394.

Danais echeria, var., Trimen, Trans. Linn. Soc. xxvi. p. 507, pl. 42. f. 7.

Hab. South Africa (Natal).

BERETHIS, n. g.

Fore wing short, triangular; costal margin very slightly arched; exterior margin very oblique; posterior margin straight; cell narrow; second subcostal emitted immediately before end of the cell; upper discocellular short and slightly curved, lower oblique. Hind wing broadly conical; exterior margin uneven, convex hindward; costal vein much curved from base; cell broad, triangular; discocellulars very oblique, upper short. Male with a single elongated indistinct glandular patch or scent-producing organ at end of submedian vein; anal conchs similar to those in *Amauris*. Antennæ thicker at the tip.

BERETHIS PHÆDON.

Papilio phædon, Fabricius, Ent. Syst. Suppl. p. 423 (1798).

Danais phædon, Godart, Enc. Méth. ix. p. 183; Butler, Catal. Lep. Fabr. B. M. p. 4.

Euplœa phædon, Boisduval, Faune Ent. de Mad. p. 37, pl. 3. f. 3 (1833).

Hab. Mauritius; Madagascar.

LINTORATA, n. g.

Wings of similar shape to *Tirumala*. Hind wing with a broad spatula-shaped scent-pouch on submedian vein.

LINTORATA MENADENSIS, n. sp.

Male. Dark purplish brown: fore wing with pale brownish-ochreous streaks along lower part of the cell, three contiguous large elongated spots below the cell between the median veins, two central discal smaller round spots, above which is a subapical series of slender oval spots, of which latter the three upper are smallest; a submarginal row of small round spots and a marginal lower row of very small spots. Hind wing with pale brownish-ochreous streaks within and below the cell, a contiguous discal series of five small spots, a submarginal row, and a marginal row of very small spots.

Expanse $3\frac{3}{4}$ inches.

Hab. Menado, S. Celebes (*Wallace*). In coll. Oxford University Museum.

b. "Sexual mark" or scent-producing organ between the median and submedian veins.

MELINDA, n. g.

Differs from *Tirumala* in the fore wing having the costa less arched, the apex narrow and prolonged, the exterior margin being more oblique and concave in the middle, the posterior margin shorter, and the cell comparatively narrower and longer. Hind wing broader, the abdominal margin longer, the cell broader and longer, the discocellular straighter, the glandular pouch being similar. Palpi more densely covered with longer hair; antennæ more gradually clavate and less pointed at tip.

MELINDA FORMOSA.

Danais formosa, Godman, Proc. Zool. Soc. 1880, p. 183, pl. 19. f. 1.

Hab. East Africa (Nguru hills, Zanzibar district).

Genus TIRUMALA.

Tirumala, Moore, Lep. of Ceylon, i. p. 4 (1880).

Danais (*Tirumala*), Marshall & de Nicéville, Butt. of India &c. p. 45 (1882).

Fore wing broad, triangular; first subcostal branch emitted at one fifth before end of the cell and free from the costal, second at end of the cell; discocellulars bent acutely inward in the middle below upper radial, and emitting a short point within the cell from the angle; lower discocellular slender near its upper end; submedian with a short lower basal veinlet. Hind wing broadly oval, exterior margin very convex; costal vein slightly curved; cell short and anteriorly oblique; second subcostal branch emitted nearer the first, and upper median nearer the middle branch than in *Radena*. Male with an open scent-pouch between the lower median and submedian veins, the pendent sac of which is prominent on the underside of the wing (the interior of the pouch containing, in the dried specimen, numerous white filaments). Antennæ shorter than in *Radena*, the club also shorter and tip more pointed. Apical joint of palpi shorter.

Larva with two pair of fleshy filaments.

Type *T. limniace*, Linn.

1. TIRUMALA PETIVERANA.

Danais petiverana, Doubleday & Hewitson, Diurn. Lep. p. 93, pl. 12. f. 1 (1847); v. d. Decken, Reise Ostafr. p. 368 (1873).

Danais leonora, Butler, Proc. Zool. Soc. 1866, p. 51; Lep. Exotica, p. 53, pl. 20. f. 2.

Petiver, Gazoph. i. pl. 3. f. 4.

Hab. West Africa (Angola).

2. TIRUMALA LIMNIACE.

Papilio limniace, Cramer, Pap. Exot. i. pl. 59. f. D, E (1775), ♀.

Danais limniacæ, Godart, Enc. Méth. ix. p. 191 (1819).

Tirumala limniaceæ, Moore, Lep. of Ceylon, i. p. 4, pl. 1. f. 3.

Danais limniace, Semper, Mus. Godeffroy, xiv. Lep. pl. 8. f. 6, ♂.

Danais (*Tirumala*) *limniace*, Marshall & de Nicéville, Butt. of India, p. 47 (1882).

Papilio exoticus, Gmelin, Syst. Nat. i. 5, p. 2289 (1788–93); Zschach, Mus. Lesk. Ent. p. 89 (1788).

Papilio similis, (part.), Fabricius, Ent. Syst. iii. p. 58 (1793).

Danais leopardus, Butler, P. Z. S. 1866, p. 52.

Petiver, Gazophyl. i. pl. 92. f. 13.

Hab. India; Ceylon; Nicobars; British Burmah; Cambodia; Hongkong; Formosa.

3. TIRUMALA ORIENTALIS.

Danais orientalis, Semper, Mus. Godeffroy, xiv. p. 140, pl. 8. fig. 5, ♂ (1879).

Hab. Philippines (*Luzon*).

4. TIRUMALA MELISSA.

Papilio melissa, Cramer, Pap. Exot. iv. pl. 377, f. C, D (1781), ♂. Herbst, Pap. pl. 125. f. 3, 4.

Hab. Java (*Horsf.*). In coll. British Museum.

5. TIRUMALA CONJUNCTA, n. sp. (Plate XXIX. fig. 2, ♂.)

Euplœa limniace, Horsfield, Catal. Lep. Mus. E.I. C. pl. 3. f. 6, larva (1829).

Danais limniacæ, Moore, Catal. Lep. Mus. E.I. C. i. p. 121, pl. 4. f. 3, 3 *a*.

Limnas (*Thal.*) *limniace*, Hübn. Exot. Schmett. i. pl. 19, ♂.

Allied to *T. melissa*. Smaller in size, but of the same colour. Differs on the fore wing in the terminal discoidal and discal markings being broader, the duplex streak between the lower median and submedian confluent, and the row of submarginal spots smaller and round. Hind wing with broader and slightly longer markings, the interspaces between the veins being entirely covered, leaving but a very slender single line between, within the cell, and one beneath it; submarginal row of spots more rounded.

Expanse 2¼ to 3 inches.

Hab. Java (*Horsfield*). In coll. British Museum and F. Moore.

This appears to be the common Java form, several specimens having been reared from the larvæ by the late Dr. Horsfield.

6. TIRUMALA CHOASPES.

Danais choaspes, Butler, P. Z. S. 1866, p. 52.

Hab. Celebes (Macassar).

7. TIRUMALA INO.

Danais ino, Butler, P. Z. S. 1871, p. 79, ♀.

Hab. Sula (*Wallace*). In coll. H. G. Smith.

8. TIRUMALA GAUTAMA. (Plate XXXI. fig. 3.)

Danais gautama, Moore, Ann. Nat. Hist. ser. 4, vol. xx. p. 43, ♀ (1877).

Danais (*Tirumala*) *gautama*, Marshall & de Nicéville, Butt. of India &c. p. 45 (1882).

Hab. British Burmah (Arakan, Moulmein, Mergui). In coll. F. Moore.

9. TIRUMALA SEPTENTRIONIS. (Plate XXIX. fig. 3, ♂.)

Danais septentrionis, Butler, Entom. Monthly Mag. xi. p. 163 (1874); Semper, Mus. Godeffroy, xiv. Lep. pl. 8. f. 7, ♂; Distant, Rhop. Malayana, p. 16, pl. 1. f. 9 (1882).

Tirumala septentrionis, Moore, Lep. of Ceylon, i. p. 5, pl. 1. f. 2 (1881).

Danais (*Tirumala*) *septentrionis*, Marshall & de Nicéville, Butt. of India, p. 48, pl. 6. f. 8, ♂ ♀ (1882).

Hab. India; Ceylon; British Burmah; Siam; Malay peninsula; Penang; Java (*Horsf.*).

10. TIRUMALA MICROSTICTA.

Danais microsticta, Butler, Entom. Monthly Mag. xi. p. 163 (1874).

Hab. Borneo (type); Java (*Horsf.*); Nias. In coll. British Museum.

A single specimen collected in Java by Dr. Horsfield is identical with the Bornean type.

11. TIRUMALA LEUCOPTERA.

Danais leucoptera, Butler, Entom. Monthly Mag. xi. p. 163 (1874).

Hab. Dorey, New Guinea.

12. TIRUMALA ISHMOIDES, n. sp.

Male. Fore wing comparatively narrower and more produced at the apex than in allies, with a very narrow basal streak and a small spot near lower end of the cell, a fusiform and a widely separated clavate streak above the submedian, two medial discal oval spots, and three slender subcostal streaks, all placed in regular successive order; submarginal and marginal spots small. Hind wing with the basal markings very similar to those in *T. leucoptera*, but somewhat broader, the costal and penultimate streaks being larger; two marginal series of spots small and slender.

Expanse $3\frac{1}{2}$ inches.

Hab. Celebes. In coll. G. Semper.

Has a similarity of form and pattern of markings to *Radena ishma*, also from the Celebes.

13. TIRUMALA HAMATA.

Euplœa hamata, M'Leay, King's Survey of Australia, ii. App. p. 46 (1827).

Danais hamata, Semper, Mus. Godeffroy, xiv. Lep. p. 139, pl. 8. f. 1, 2, ♂ (1879).

Danais australis, Blanchard, Voy. Pôle Sud, Ins. p. 388, pl. 2. f. 5, 6 (1837–40).

Hab. Australia.

14. TIRUMALA ANGUSTATA, n. sp.

Intermediate between *T. hamata* and *T. melittula*. Fore wing with the discoidal and basal streak very slender, the terminal spot narrower than in *T. hamata* and much more so than in *T. melittula*; the two transverse discal series of spots disposed as in *T. melittula*, except that the upper elongated streaks are longer and the lower spot is widely disconnected from the basal streak below the cell; the marginal spots are slightly larger. Hind wing with similar but somewhat larger markings to those in *T. melittula*, the dark central streak within the cell less forked and not touching the discocellular veinlet.

Expanse $2\frac{4}{8}$ to $2\frac{5}{8}$ inches.

Hab. Tongatabu, Friendly Islands. In coll. British Museum.

15. TIRUMALA MELITTULA.

Danais melittula, H. Schäff. Stettin. ent. Zeit. 1869, p. 70; Semper, Mus. Godeffroy, xiv. Lep. pl. 8. f. 3, ♂.

Hab. Upolu, Samoa Islands.

16. TIRUMALA OBSCURATA.

Danais obscurata, Butler, P. Z. S. 1874, p. 275.

Hab. Upolu, Solomon Islands.

17. TIRUMALA MODERATA.

Danais moderata, Butler, P. Z. S. 1875, p. 611.

Hab. New Hebrides (Vate).

18. TIRUMALA NEPTUNIA.

Danais neptunia, Felder, Reise Novara, Lep. ii. p. 349, pl. 43. f. 1 (1867); Semper, Mus. Godeffroy, xiv. Lep. pl. 8. f. 4, ♂ (1879).

Hab. Fiji Islands.

19. TIRUMALA CLARIBELLA.

Danais claribella, Butler, Ann. Nat. Hist. ser. 5, vol. x. p. 36, ♀ (1882).

Hab. Fiji Islands.

NASUMA, n. g.

Male. Fore wing triangular; costa long, apex much produced; exterior margin very oblique, convex below the apex and waved hindward; posterior margin very short; discocellulars convex, emitting a short discoidal spur within the cell in a line with lower radial. Hind wing broad, triangularly oval; exterior margin sinuous, oblique, and prolonged hindward; anterior and abdominal margin long; glandular pouch or scent-producing organ small, and covered by a projecting lappet.

NASUMA ISMARE.

Papilio ismare, Cramer, Pap. Exot. iii. pl. 279. f. E, F (1782), ♂.

Danais ismare, Godart, Enc. Méth. ix. p. 190.

Danais ismareola, Butler, P. Z. S. 1866, p. 50, ♀; id. p. 172, f. 1 (hermaphrodite).

Hab. Moluccas (Ternate); Amboina.

Genus ANOSIA.

Anosia[1], Hübner, Verz. bek. Schmett. p. 16 (1816).

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[1] Hübner's first species of *Anosia* (*archippus*, Cram. pl. 16. f. *a*, *b*) is congeneric with the species of his genus *Callianira* (Hübn. Verz. p. 38); and his second species (*misippus*, Linn.) is referable to his genus *Esoptria* (Hübn. p. 45), both of which species were placed in the genus *Anosia* by Hübner, owing to their resemblance to the others. The consequent exclusion of these two species from the genus thus necessarily limits it to the remainder; his third species (*menippe*) therefore becomes the type. Hübner's own action, in subsequently using the generic name for a conspecific insect, fixes this third-cited species as the type.

Danaida[1], Latreille, Hist. Nat. des Crust. et Ins. xiv. p. 108 (1805); Scudder, Bull. Buff. Soc. N. H. 1875, p. 245.

Euplœa (part.), Fabricius, Illiger's Mag. vi. p. 280 (1807).

Danais, Latreille, Illiger's Mag. vi. p. 292 (1807); Strecker, Butt. & Moths N. Amer. p. 105 (1878).

Danaus (part.)[2], Latr. Gen. Crust. et Ins. iv. p. 201 (1809); id. Consid. Gén. Crust. et Ins. p. 352 (1810).

Danaus, Scudder, Syst. Revis. Amer. Butt. p. 7, Peabody Acad. of Sci. (1871).

Fore wing lengthened, triangular; apex prolonged; exterior margin very oblique; cell long; upper discocellular bent inward, deeply concave and angled before reaching the lower radial, emitting a short discoidal spur within the cell from the point; lower discocellular very oblique, submedian with a short lower basal veinlet. Hind wing oval; cell long; discocellulars long and very oblique. Male with a small pouch or scent-producing organ close to lower median vein, much less prominent than in *Salatura* (*S. genutia*). Thorax and base of abdomen very hairy. Antennæ with a well-formed stout club at the tip. Palpi stout, densely hairy to the tip. Middle and hind legs black.

Larva (figured by Smith-Abbott) with two pairs of fleshy filaments.

Type *P. plexippus* (*P. archippus*, Fabr.).

1. ANOSIA PLEXIPPUS.

Papilio plexippus, Linn. Syst. Nat. ed. x. p. 471 (1758); Mus. Ulr. p. 262 (1764); Syst. Nat. ed. xii. p. 767 (1767); Cram. Pap. Exot. iii. pl. 206. f. E, F, ♀ (1779); Fabr. Ent. Syst. iii. p. 49 (1793); Herbst, Pap. pl. 156. f. 1, 2; De Beauvoir, Ins. Afr. et Amér. p. 172, pl. 4. f. *a*, *b*; Turton, Syst. of Ent. ii. p. 59 (1806).

Danaida plexippus, Latreille, Hist. Nat. Crust. et Ins. xiv. p. 108 (1805); Scudder, Bull. Buffalo Soc. Nat. Sci. 1875, p. 245.

Euplœa plexippus, Fabricius, Illiger's Mag. vi. p. 280 (1807).

Limnas ferrugineus plexippus, Hübner, Samml. exot. Schmett. Bd. i. pl. 20. f. 2 (1806).

Danais plexippus, Latreille, Illiger's Mag. vi. p. 292 (1807); Strecker, Lep. N. Amer. p. 105 (1878).

Danaus plexippus, Latreille, Gen. Crust. et Ins. iv. p. 201 (1809); id. Consid. Gén. C. et Ins. p. 353 (1810); Say, Amer. Ent. iii. pl. 54, ♂ (1828); Peale, Lep. Amer. i. pl. 7 (1833); Scudder, Syst. Rev. Amer. Butt. Peabody Acad. Sci. 1871, p. 7.

Idea plexippus, Eschscholtz, Kotzeb. Reise, iii. p. 209, pl. 7. f. 14, *a*, *b* (1821).

Papilio erippus, Cramer, Pap. Exot. i. pl. 3. f. A, B, ♂ (1775).

Danais erippus, Semper, Mus. Godeffroy, xiv. Lep. p. 41 (1879).

Papilio archippus, Fabricius, Ent. Syst. iii. p. 49 (1793); Smith,

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[1] Preoccupied in botany. Also a plural name, and therefore inadmissible.

[2] The name "*Danaus*" having been adopted in a generic sense by Esper, Panzer, &c. for species of *Pierinæ*, previous to its adoption by Latreille in 1807, the name "*Danais*" cannot be retained in this subfamily of Butterflies. (See note to subfamily *Euplœinæ*, p. 213, *antè*.

Abbott, Ins. Georgia, i. pl. 6 (1797); Brown, Const. Miscellany, Butt. i. p. 156, pl. 23 (1832).

Danais archippus, Godt. Enc. Méth. ix. p. 184; Boisd. et Lec. Lep. Amér. Sept. p. 137, pl. 40 (1833); Harris, Ins. Injur. to Veg., Flint's ed. p. 280; Saunders, Canadian Ent. v. pp. 4–8, figs. 1–5 (1873); Edwards, Birds of N. A. i. p. 9; Butler, Catal. Fabrician Lep. B. M. p. 5.

Anosia menippe, Hübner, Verz. bek. Schmett. p. 16 (1816).

Anosia megalippe, Hübner, Samml. exot. Schmett. Bd. ii. pl. 7, ♂ (1820–21).

Petiver, Mus. p. 52, no. 527 (1695).

Catesby, Nat. Hist. Carolina, ii. p. 88, pl. 88 (1743).

Hab. N. America (southern parts of British Possessions, United States); Bermudas; Antilles; Mexico; Central and South America as far as Rio.

2. ANOSIA PLEXAURE.

Danais plexaure, Godart, Enc. Méth. ix. p. 184 (1819).

?*Danais brasiliensis*, Capr. Ann. Ent. Belg. 1874, p. 22.

Hab. Brazil.

3. ANOSIA CLEOPHILE.

Danais cleophile, Godart, Enc. Méth. ix. p. 185 (1819); Doubleday & Hewits. D. Lep. pl. 12. f. 3.

Hab. Haiti; Jamaica.

TASITIA, n. g.

Anosia (part), Hübner, Verz. bek. Sch. p. 15.

Anosia, Scudder, Bull. Buff. Soc. N. H. 1875, p. 246.

Fore wing shorter and less regularly triangular in form than in *Anosia* (*Plexippus*); costa arched at the base, exterior margin slightly convex below the apex; cell comparatively shorter and broader; discocellulars shorter, concave in the middle, emitting a short discoidal spur within the cell opposite the lower radial; lower discocellular slender at its upper end. Hind wing narrower, much more convex internally, the costal and abdominal margins shorter; cell shorter and broader; first subcostal branch emitted further from the base; discocellulars shorter, the upper much bent. Male with a larger but shorter and more conspicuous scent-pouch close to the lower median vein. Antennæ shorter, club slender at tip. Palpi smaller, more slender and less hairy. Middle and hind legs black.

Larva (*T. berenice*, figured by Smith Abbott, and *T. eresimus*, figured by Stoll) with three pairs of fleshy filaments.

Type *T. gilippus*, Cram.

1. TASITIA BERENICE.

Papilio berenice, Cramer, Pap. Exot. iii. pl. 205. f. E, F (1779).

Danais berenice, Boisd. et Lec. Lép. Amér. Sept. p. 134, pl. 39 (1833); Butler, Catal. Lep. Fabr. B. M. p. 4; Proc. Zool. Soc.

1866, p. 454; Strecker, Lep. N. Amer. p. 106 (1878); Godman & Salvin, Biologia Centr.-Amer. Lep. p. 3.

Anosia berenice, Scudder, Bull. Buffalo Soc. Nat. Hist. p. 246 (1875).

Papilio erippus, Fabr. Mant. Ins. ii. p. 27 (nec Cram.).

Anosia erippe, Hübn. Verz. bek. Schmett. p. 16.

Danais erippe, Godt. Enc. Méth. ix. p. 186.

Papilio gilippus, Smith, Abbott, Lep. Ins. Georgia, i. pl. 7 (nec Cram.).

Hab. North America (Southern United States, New Mexico).

2. TASITIA STRIGOSA.

Danais strigosa, Bates, Ent. Monthly Mag. i. p. 32 (1864); Distant, Proc. Zool. Soc. 1876, p. 10.

Anosia strigosa, Scudder, Bull. Buff. Soc. N. H. p. 246.

Hab. North America (Texas).

3. TASITIA JAMAICENSIS.

Danais jamaicensis, Bates, Ent. Monthly Mag. i. p. 33 (1864); Butler, Proc. Zool. Soc. 1866, p. 454.

Sloane's 'Jamaica,' ii. p. 214, pl. 239. f. 5, 6 (1725).

Hab. Jamaica.

4. TASITIA GILIPPUS.

Papilio gilippus, Cramer, Pap. Exot. i. pl. 26. f. E, F, ♀ (1775).

Danais gilippe, Godt. Enc. Méth. ix. p. 186.

Danais gilippus, Butler, Catal. Fabrician Lep. B. M. p. 4.

Limnas ferrugineus vincetoxici, Hübn. Samml. exot. Schmett. Bd. i. pl. 23 (1806).

Anosia vincetoxici, Hübn. Verz. bek. Schmett. p. 16.

Idea manuja, Esch. Kotzeb. Reise, iii. p. 209, pl. 7. f. 13, *a*, *b* (1821).

Hab. South America.

5. TASITIA THERSIPPUS.

Danais thersippus, Bates, Proc. Zool. Soc. 1863, p. 243.

Hab. ——?

6. TASITIA CLEOTHERA.

Danais cleothera, Godt. Enc. Méth. ix. p. 185 (1819); Doubleday et Hewits. D. Lep. pl. 12. f. 2; Godman et Salvin, Biologia Centr.-Amer., Lep. p. 3.

Hab. Central America.

7. TASITIA ERESIMUS.

Papilio eresimus, Cramer, Pap. Exot. ii. pl. 175. f. G, H (1777); Stoll, Suppl. Cram. pl. 6. f. 4, larva.

Anosia eresima, Hübn. Verz. bek. Schmett. p. 16.

Danais eresimus, Butler, Catal. Fabrician Lep. B. M. p. 5; Proc. Zool. Soc. 1866, p. 454.

Hab. South America.

8. TASITIA XANTHIPPUS.

Danais xanthippus, Felder, Wien. Ent. Monats. 1860, p. 100.
Hab. Brazil.

9. TASITIA HERMIPPUS.

Danais hermippus, Felder, Reise der Novara, Lep. ii. p. 348 (1867).
Hab. South America (New Granada; Bogota).

Genus LIMNAS.

Limnas[1], Hübner, Tentamen, i. p. 1 (1806), nec Boisd. et auct.
Danais (*Salatura*, sect. A), Marshall and deNicéville, Butt. of India &c. p. 49 (1882).

Fore wing narrower, and of a comparatively more lengthened triangular form than in *Salatura* (*genutia*); costa less arched and the apex more produced, exterior margin less uneven. Hind wing regularly convex exteriorly and the margin more even; costal vein abruptly arched; cell shorter at its upper end; discocellulars bent inward near the middle, emitting a short discoidal spur or veinlet within the cell from the angle, lower discocellular slender at its upper end, lower radial from middle of discocellulars opposite the inner spur. Pouch in male similar. Antennæ stouter, with a well formed thick club.

Larva with three pairs of fleshy filaments.

Type *L. chrysippus*.

1. LIMNAS CHRYSIPPUS.

Papilio chrysippus, Linnæus, Syst. Nat. (1758) p. 471; Mus. Ulr. p. 263 (1764); Syst. Nat. i. 2, p. 767 (1767); Cramer, Pap. Exot. ii. pl. 118. f. B, C; Fabricius, Ent. Syst. iii. 1, p. 50; Hübn. S. eur. Schmett. i. pl. 133. f. 678–9.

Limnas ferr. chrysippus, Hübn. Samml. exot. Schmett. Bd. i. pl. 22. f. 1–4 (1806).

Limnas chrysippus, Hübner, Tentamen, i. p. 1 (1806).

Euplœa chrysippus, Hübner, Verz. bek. Schmett. p. 15; Herbst, Pap. pl. 155. f. 1, 2; Ochsenh. pl. 4. f. 11, 12; Zink. Somm. Nova Acta Acad. Nat. Cur. 1831, p. 173.

Danais chrysippus, Godart, Enc. Méth. ix. p. 187; Lép. de France, p. 106, pl. 27. f. 1, 2; Latreille, Dict. d'Hist. Nat. 2nd ed. pl. 9, p. 118; Moore, Catal. Lep. Mus. E.I. C. i. p. 126; Trimen, Rhop. Africæ Austral. p. 88; Butler, Catal. Lep. Fabr. B. M. p. 5; Distant, Rhop. Malayana, p. 20, pl. i. fig. 10.

Salatura chrysippus, Moore, Lep. of Ceylon, i. p. 7, pl. 3. f. 1.

Papilio ægyptius, Schreb. Ins. p. 9, f. 11, 12 (1759).

Danaida chrysippus, Aurivillius, Kong. Vet.-Akad. Handl. 1882, p. 70.

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[1] Hübner having adopted this name for *P. chrysippus* and other species of Danainæ in the Samml. exot. Schmett., thus fixed its type and its restriction to the present group of Butterflies.

Danais (*Salatura*) *chrysippus*, Marshall and de Nicéville, Butt. of India, p. 50, pl. 6. fig. 10, ♂ ♀ (1882).

Papilio asclepiadis, Gagl. Atti Instit. Incorr. Napol. i. p. 155, pl. 1 (1811); Ochsenh. Schmett. Europ. iv. p. 124 (1816).

Hab. S.E. Europe, W. and S. Africa. Madagascar, Rodriguez, Johanna, Mauritius, Socotra, Turkey in Asia, Persia, Afghanistan, Candahar, India, Ceylon, Nicobars, Burmah, Siam, Malay peninsula, Penang, Singapore, Sumatra, Lombock, Kaiva, S. China, Hainan, Formosa, Philippines.

2. LIMNAS ALCIPPUS.

Papilio alcippus, Cramer, Pap. Exot. ii. pl. 127. f. E, F (1777); Fabr. Ent. Syst. iii. 1, p. 50; Herbst, Pap. pl. 155. f. 5, 6.

Danais alcippus, Godart, Enc. Méth. ix. p. 188; Lép. de France, p. 110, pl. 17. f. 3; Peters, Reise n. Mossambique, Zool. p. 370 (1862); Butler, Catal. Lep. Fabr. B. M. p. 5.

Hab. Sierra Leone; Ashanti.

3. LIMNAS ALCIPPOIDES, n. sp. (Plate XXXI. fig. 1.)

? *Danais alcippus*, Marshall and de Nicéville, Butt. of India, p. 51.

From W. African specimens of *L. alcippus* this differs in the fore wing having a broader series of white subapical oblique spots, the white spot below these (between the upper and middle median veins) is much larger; and there is a lower discal spot on the red area between the middle and lower medians, which is not present in any West-African specimens that I have seen. The hind wing has somewhat less white than the African specimens.

Expanse 3 inches.

Hab. Nepal (*Gen. Ramsay*). In coll. F. Moore.

Marshall and de Nicéville refer to *L. alcippus* as occurring in the plains of Northern India (Sind, Nurpur in the Punjab), in the N.W. Provinces (Lucknow), and also at Rangoon.

4. LIMNAS DORIPPUS.

Euplœa dorippus, Klug, Symb. Phys. pl. 48. f. 1–5 (1829).

Danais dorippus, Peters, Reise n. Mossamb. Zool. p. 371 (1862); Oberthür, Etud. Ent. 1878, p. 24, pl. 1. f. 5.

Danais (*Salatura*) *dorippus*, Marshall and de Nicéville, Butt. of India, p. 52 (1882).

Hab. E. Africa (Zanzibar); Arabia, S. Persia, Beluchistan, Western India (Sind, Kutch). In coll. F. Moore.

5. LIMNAS BATAVIANA, n. sp.

Euplœa chrysippus, Horsfield, Catal. Lep. Mus. E.I. C. pl. 2. figs. 9, 9*a*, larva (1828).

Danais chrysippus, Moore, Catal. Lep. Mus. E.I. C. i. pl. 4. figs. 7. 7*a*, larva (1857).

Near to *L. cratippus*. Differs in the fore wing being comparatively more produced at the apex, the dark apical area of a less blackish tint, spreading less over the disk, and has there a more regular scalloped border; marginal rows of spots similar; there are two lower discal white spots in the male, making three from below the oblique subapical band, the upper spot being larger (in *L. cratippus* there is only one spot); at the end of the cell is also a more or less distinct spot; hind wing with a distinct row of white spots on the blackish marginal band.

Expanse 2¼ to 3 inches.

Hab. Java (*Horsf.*). In colls. British Museum and F. Moore.

6. LIMNAS BOWRINGI, n. sp.

Differs from *L. chrysippus* on the fore wing in the subapical macular band being composed of four somewhat longer spots, and having two lower spots of large size (larger than in any specimen of *L. chrysippus* under examination); the two costal spots are also somewhat longer, and the submarginal middle spots are larger.

Expanse, ♂ ♀ 3½ inches.

Hab. Hongkong. In coll. British Museum.

A female variety (?) from Hongkong, also in the British-Museum collection, has a large dentate spot between the small spot beyond the end of the cell and the subapical series.

7. LIMNAS CRATIPPUS.

Danais cratippus, Felder, Sitzb. Akad. Wiss., math.-nat. Cl. xl. p. 449 (1860).

Hab. Amboina (type); Ceram.

8. LIMNAS PETILIA.

Papilio petilia, Stoll, Cram. Pap. Exot. Suppl. pl. 28. f. 3 (1790).

Danais petilia, Godart, Enc. Méth. ix. p. 189; Semper, Mus. Godeffroy, xiv. p. 141 (1879).

Hab. Australia (New Holland, Moreton Bay).

Genus SALATURA.

Salatura, Moore, Lep. of Ceylon, i. p. 5 (1880).

Euplœa (part), Hübner, Verz. bek. Schmett. p. 15 (1816).

Danais (part), Godart, Doubleday, Hewitson, Butler, Distant.

Danais (*Salatura*, sect. B), Marshall and de Nicéville, Butt. of India &c. p. 49 (1882).

Fore wing subtriangular, costa slightly arched, apex more or less rounded, exterior margin waved, oblique and slightly convex in the middle, posterior margin slightly recurved; costal vein extending to two thirds the wing; first subcostal branch emitted at one fifth before end of the cell, second at the end of the cell, third and fourth at equal distance beyond its end; cell long; upper discocellular bent inward and angled at lower end above the lower radial, emitting a short discoidal spur within the cell from the lower angle; lower discocellular slender at its upper end, outwardly oblique; radials from angles of upper discocellular; median branches widely separated, submedian slightly recurved, with a short slender veinlet emitted from below near the base. Hind wing broadly oval; exterior margin rounded, slightly sinuous; costal vein short, curved upward; precostal straight; first subcostal emitted before end of the cell and curving upward before the apex, second slightly bent at end of the cell; discocellulars very oblique, upper shortest and slightly concave, radial from their middle; second median branch from near end of the cell, lower bent near its base; submedian nearly straight; internal recurved. Male with an open scent-pouch between lower median and submedian veins. Body long; palpi pilose; middle and hind legs slender; antennæ with a gradually formed lengthened slender club.

Larva with three pairs of fleshy filaments.

Type *S. genutia*.

1. SALATURA GENUTIA.

Papilio genutia, Cramer, Pap. Exot. iii. pl. 206. f. C, D (1779); Herbst, Pap. pl. 154. f. 1, 2.

Limnas ferruginea genutia, Hübner, Samml. exot. Schmett. Bd. i. pl. 21. f. 1, 2 (1806).

Salatura genutia, Moore, Lep. of Ceylon, i. p. 6, pl. 4. f. 2 (1880).

Danais genutia, Distant, Trans. Ent. Soc. Lond. 1877, p. 3; Rhop. Malayana, p. 18, pl. 2. fig. 2, ♂ (1882).

Danais (*Salatura*) *genutia*, Marshall and de Nicéville, Butt. of India, p. 52 (1882).

Papilio plexippus (part), Fabr. Spec. Ins. p. 55.

Euplœa plexippus (part), Hübn. Verz. bek. Schmett. p. 15.

Danais plexippus (part), Godt. Enc. Méth. ix. p. 186.

Danais plexippus, Doubleday and Hewits. Gen. D. L. p. 92; Moore, Catal. Lep. Mus. E.I. C. i. p. 124; Butler, P. Z. S. 1866, p. 47.

Danaida plexippus, Aurivillius, Kongl. Vet.-Akad. Handl. 1882, p. 69.

Hab. India, Ceylon, Andamans, Nicobars, Burmah, Siam, Malay peninsula, Penang, South China, Hainan, Formosa, Hongkong, Philippines.

2. SALATURA NIPALENSIS. (Plate XXXI. fig. 2.)

Danais nipalensis, Moore, Ann. Nat. Hist. 1877, p. 43.

Danais (*Salatura*) *nipalensis*, Marshall and de Nicéville, Butt. of India, p. 54 (1882).

Hab. Nepal (*Gen. Ramsay*). In coll. F. Moore.

3. SALATURA INTENSA, n. sp.

Euplœa plexippus, Horsfield, Catal. Lep. Mus. E.I. C. pl. 3. f. 8, larva (1829); Zink. Somm. Nova Acta Acad. Nat. Cur. 1831, p. 172.

Danais philene, Moore, Catal. Lep. Mus. E.I. C. i. p. 124, pl. 4. f. 5, 5*a*.

Smaller than *S. genutia*. Differs from it in the red interspace on both wings being of a much darker tint. On the fore wing there is no red spot between the upper and middle median veins, which is always present in *S. genutia*; the subapical white spots are also narrower. On the hind wing there is only a single row of marginal spots, which are very small, and in the male obsolescent.

Expanse, ♂ $2\frac{3}{8}$, ♀ $2\frac{6}{8}$ inches.

Hab. Java (*Horsfield*); Lombok; Borneo. In colls. British Museum and F. Moore.

Note. The larva of this species figured by Horsfield (*l. c.*) is erroneously (?) represented with only two pairs of fleshy filaments.

4. SALATURA NESIPPUS.

Danais nesippus, Felder, Verh. zool.-bot. Ges. xii. p. 486 (1862); Reise der Novara, Lep. ii. p. 347; Moore, P.Z.S. 1877, p. 582.

Danais (Salatura) nesippus, Marshall & de Nicéville, Butt. of India, p. 55 (1882).

Hab. Nicobars (Sambelong, Nancowry, Kar Nicobar).

5. SALATURA MELANIPPUS.

Papilio melanippus, Cramer, Pap. Exot. ii. pl. 127. f. A, B (1777); Herbst, pl. 155. f. 7, 8.

Danais melanippus, Godart, Enc. Méth. ix. p. 189.

Hab. Java (*Horsfield*).

6. SALATURA INTERMEDIA, n. sp.

Danais genutia, var., Distant, Rhopaloc. Malayana, p. 18. pl. 2. f. 3, ♂.

Intermediate between *S. genutia* and *S. sumatrana*. Fore wing, in *both sexes*, like that of *S. genutia*, except that the black median veins are narrower. Hind wing, in *both sexes*, with similar breadth and length of interspaces between the veins as in *S. genutia*; but these interspaces are white, and their outer ends only slightly suffused with red; the marginal white spots are larger than those in *G. sumatrana*.

Expanse, ♂ ♀ $3\frac{3}{8}$ inches.

Hab. Malacca, Singapore. In colls. Brit. Museum and F. Moore.

7. SALATURA HEGESIPPUS.

Papilio hegesippus, Cramer, Pap. Exot. ii. pl. 180. f. A (1777), ♀; Fabricius, Ent. Syst. iii. p. 52.

Danais hegesippus, Godart, Enc. Méth. ix. p. 189.

Danais (Salatura) hegesippus, Marshall & de Nicéville, Butt. of India, p. 55 (1882).

Danais melanippus, Gray, Lep. Ins. of Nepal, p. 10, pl. 9. f. 1 (1846).

Danais melanippus, var. *hegesippus*, Distant, Rhop. Malayana, p. 19, pl. 2. f. 1 (1882).

Hab. Eastern Bengal, Orissa, British Burmah, Malay peninsula, Penang.

Note. The specimen of *S. hegesippus* in the British-Museum collection labelled "Java" was found, upon examination of the original register, to have been received from Penang.

8. SALATURA SUMATRANA, n. sp.

Smaller than *S. hegesippus.* Differs in both sexes in the fore wing being marked like *S. intensa,* and the black median vein extending narrowly to the base, not broadly so as in *S. hegisippus*: the hind wing has broader white interspaces between the veins, these white streaks all being red at their outer end; the marginal rows of white spots are smaller and are disposed in a more regularly linear succession, not placed in obliquely opposite pairs as in *S. hegesippus.*
Expanse, ♂ ♀ 2¾ inches.
Hab. Sumatra. In coll. F. Moore.

9. SALATURA LOTIS.

Papilio lotis, Cramer, Pap. Exot. iii. pl. 230, f. D, E (1780).
Danais lotis, Godart, Enc. Méth. ix. p. 189.
Hestia thoë, Hübner, Verz. bek. Schmett. p. 15 (1816).
Hab. Borneo.

10. SALATURA EDMONDI.

Danais edmondii, Bougainville, Voy. Thétis, ii. p. 344, pl. 44. f. 3 (1837).
Hab. Philippines (Bohol, Mindanao, Luzon).

11. SALATURA NUBILA.

Danais nubila, Butler, P. Z. S. 1866, p. 171.
Hab. Gilolo.

11 *a*. SALATURA PHILENE.

Papilio philene, Cramer, Pap. Exot. iv. pl. 375. figs. A, B (1782).
Danais philene, Godart, Enc. Méth. ix. p. 187.
Hab. Amboina. In coll. British Museum.

12. SALATURA ARTENICE.

Papilio artenice, Cramer, Pap. Exot. iv. pl. 375. f. C, D (1782).
Danais artenice, Godart, Enc. Méth. ix. p. 187.
Hab. ? Java.

13. SALATURA MYSOLICA, n. sp.

Intermediate between *S. artenice* and *S. nubila.* Comparatively larger than *S. nubila.* On the fore wing the red streak is reduced to a very slender line along lower end of the cell; the subapical spots are all much larger. On the hind wing the dull red colour is restricted to the middle of the wing, and extends to only half the space between end of the cell and outer margin.
Expanse 3⅝ inches.
Hab. Mysol (*Wallace*). In coll. British Museum.

14. SALATURA CONSPICUA.

Danais conspicua, Butler, P. Z. S. 1866, p. 49, pl. 4. f. 2.

Danais leucoglene, Felder, Reise d. Novara, Lep. ii. p. 347, pl. 43. f. 2 (1867).

Hab. Celebes.

15. SALATURA FULGURATA.

Danais fulgurata, Butler, P. Z. S. 1866, p. 48, pl. 4. f. 1; Kirsch, Mitth. zool. Mus. Dresden, i. p. 114 (1877).

Hab. Celebes.

16. SALATURA CHIONIPPE.

Euplœa chionippe, Hübner, Samml. exot. Schmett. Bd. ii. pl. 6. f. 1, 4, ♂ ♀ (1820–24).

Idea abigar, Esch. Kotzeb. Reise, iii. p. 209, pl. 7. f. 12, *a*, *b* (1821), ♀.

Danais chionippe, Butler, P. Z. S. 1866, p. 171.

Danais cecilia, Bougainville, Voy. Thétis, ii. p. 342, pl. 44. f. 1, ♂ (1837).

Hab. Philippines (Manilla, Luzon).

17. SALATURA AFFINIS.

Papilio affinis, Fabricius, Syst. Ent. p. 511 (1775); Ent. Syst. iii. 1, p. 58 (1793); Donovan, Ins. of Ind. pl. 25. f. 2.

Danais affinis, Godart, Enc. Méth. ix. p. 182; Blanchard, Voy. Pôle Sud, p. 389, pl. 2. f. 7; Butler, Catal. Lep. Fabr. B. M. p. 6.

Hab. Ceram; Amboyna; Cape York, N. Australia.

18. SALATURA ARUANA, n. sp.

Allied to *S. affinis*. Male and female of a uniform ferruginous brown; fore wing with similar markings, the white spots smaller, the discal interspaces dull white and much restricted, the upper space confined to a very small triangular streak above base of lower median, and the lower space mostly suffused with brown; on the hind wing the dull white area is transversely much narrower and is broadly traversed by brown veins.

Expanse, ♂ 1¾, ♀ 2 inches.

Hab. Aru (*Wallace*). In colls. F. Moore and British Museum.

19. SALATURA NIGRITA, n. sp.

Male. Smaller than *S. affinis* from Ceram and Cape York. Blacker in colour, and the markings of a duller white tint. On the fore wing the white subapical spots are more regular in succession, the penultimate lower spot square, the white interspaces below the cell somewhat narrower; hind wing with the medial white area narrower.

Expanse 2¼ inches.

Hab. Australia. In coll. British Museum.

20. SALATURA FERRUGINEA.

Danais ferruginea, Butler, Ann. Nat. Hist. ser. 4, vol. xviii. p. 240 (1876).

Hab. N. Guinea.

21. SALATURA MYTILENE.

Danais mytilene, Felder, Wien. ent. Monats. iv. p. 232 (1860).

Danais pullata, Butler, Proc. Zool. Soc. 1866, p. 47, f. 1, ♂.

Hab. New Guinea (Dorey).

21 *a*. SALATURA ADUSTUS.

Danais adustus, Godman & Salvin, P. Z. S. 1882, p. 755.

Hab. New Ireland.

22. SALATURA INSOLATA.

Danais insolata, Butler, Ann. Nat. Hist. ser. 4, vol. v. p. 360 (1870); Brenchley's Voy. Curaçoa, p. 468, pl. 48. f. 1.

Hab. Solomon Islands.

23. SALATURA DECIPIENS.

Salatura decipiens, Butler, Ann. Nat. Hist. ser. 5, vol. x. p. 37 (1882).

Hab. Solomon Islands.

24. SALATURA BISERIATA.

Salatura biseriata, Butler, Ann. Nat. Hist. ser. 5, vol. x. p. 37 (1882).

Hab. Duke-of-York Island.

C. *Two "sexual marks" or scent-producing organs on hind wing.*

a. Sexual mark on both the median and submedian veins.

RAVADEBA, n. g.

Danais (*Parantica*), sect. A, part., Marshall & de Nicéville, Butt. of India &c. p. 35 (1882).

Male with a shorter and broader fore wing than in *Bahora*, the apex being more blunt and the exterior margin less oblique; discocellulars convexly angular in the middle, emitting a very short point within the cell; lower radial from below the angle: hind wing more regularly quadrate, the costa being shorter, the exterior margin angularly produced in the middle, and the anal angle more prominent; scent-pouches similar.

Type *R. cleona.*

1. RAVADEBA CLEONA.

Papilio cleona, Cramer, Pap. Exot. iv. pl. 377. fig. F (1781).

Danais cleona, Blanchard, Voy. Pôle Sud, p. 386, pl. 2. f. 3 (1853).

Danais (*Parantica*) *cleona*, Marshall & de Nicéville, Butt. of India &c. p. 36 (1882).

Hab. Celebes.

2. Ravadeba lutescens.

Danais lutescens, Butler, Proc. Zool. Soc. 1866, p. 172, fig. 3, ♀.
Hab. Ceram; Bouru; Batchian.

3. Ravadeba phyle.

Danais phyle, Felder, Wien. ent. Monats. 1863, p. 105; Novara-Reise, Lep. ii. p. 348, pl. 42. fig. 8, ♂.
Hab. Philippines (Luzon, 4000 to 5000 feet).

Bahora, n. g.

Danais (*Parantica*, Sect. A, part.), Marshall & de Nicéville, Butt. of India &c. p. 35.

Male with a comparatively narrower fore wing than in *Parantica*; fore wing with the subcostal emitted at one fifth before end of the cell, first branch free; discocellulars bent below the upper radial, producing a short spur within the cell from the angle; lower discocellular slender at its upper end: hind wing more arched near base of the costa, the exterior margin more oblique below the apex and convexly angular beyond the middle; abdominal margin also longer; pouches similar. Female with more rounded exterior margins.
Type *B. philomela*.

1. Bahora aspasia.

Papilio aspasia, Fabricius, Mant. Ins. ii. p. 15 (1787); Ent. Syst. iii. p. 170.
Danais aspasia, Butler, Catal. Fabr. Lep. B. M. p. 7.
Hab. Borneo.

2. Bahora philomela.

Euplœa philomela, Zink.-Som. Nova Acta Acad. Nat. Cur. xv. p. 184, pl. 16. fig. 17 (1831).
Euplœa philomela, Butler, P. Z. S. 1866, p. 456.
Danais (*Parantica*) *philomela*, Marshall & de Nicéville, Butt. of India &c. p. 36.
Hab. Java; ? Billiton.

3. Bahora crocea.

Danais crocea, Butler, Proc. Zool. Soc. 1866, p. 57, pl. iv. fig. 5.
Danais aspasia, var. *crocea*, Distant, Rhopalocera Malayana, p. 13, pl. 1. fig. 7 (1882).
Danais (*Parantica*) *crocea*, Marshall & de Nicéville, Butt. of India &c. p. 37 (1882), pl. 5. f. 6, ♂.
Hab. British Burmah, Kyouk Phyoo; Mergui (*Anderson*); Malay peninsula; Province Wellesley; Penang (*Distant*); Malacca; Singapore (*Wallace*); Sumatra (*Buxton*).

Phirdana, n. g.

Fore wing very short, broad, triangular, apex convex, exterior margin oblique, cell comparatively long and broad at the end; discocellulars bent below the upper radial, producing a short spur within the cell from the angle; lower discocellular slender at its upper end. Hind wing short, broad, oval; cell long; costal vein much arched at the base, first subcostal branch and lower median branch emitted opposite to one another before half length of the cell, both being comparatively longer than in *Parantica*. Male with two spatula-shaped scent-pouches, a large one on lower median vein and a small one on submedian vein. Antennæ stout, with a well-formed thick club. Palpi small, pointed at tip.

PHIRDANA PUMILA.

Danais pumila, Boisd. Bull. Ent. Soc. France, 1859, p. 156.

Danais mariana, Butler, Ann. Nat. Hist. ser. 3, vol. xvi. p. 397 (1865); Proc. Zool. Soc. 1866, p. 58, pl. 4. fig. 6.

Hab. New Caledonia (Loyalty Island).

PHIRDANA HEBRIDESIA.

Danais hebridesia, Butler, P. Z. S. 1875, p. 610, pl. 67. f. 6, ♀.

Hab. New Hebrides (Aneiteum).

ASTHIPA, n. g.

Fore wing somewhat short, apex broad and very convex, exterior margin slightly oblique; first subcostal branch emitted at one fourth before end of the cell, free; second branch at a short distance before its end, recurved; discocellulars bent below the upper radial, producing a very short point within the cell from the angle, lower discocellular slender at its upper end; upper radial from near subcostal, lower from above the middle angle. Hind wing broad, convex externally, costal margin slightly curved, cell narrowed at both ends. Male with a long spatula-shaped scent-pouch on lower median vein and a small (? rudimentary) pouch near inner side of submedian vein. Antennæ with a long slender tip. Palpi small, tip pointed.

Type *A. vitrina*.

1. ASTHIPA MELANOLEUCA.

Danais melanoleuca, Moore, Proc. Zool. Soc. 1877, p. 581, pl. 58. f. 3.

Danais (*Parantica*) *melancleuca*, Marshall & de Nicéville, Butt. of India &c. p. 38 (1882).

Hab. South Andaman Isles.

2. ASTHIPA VITRINA.

Danais vitrina, Felder, Wien. ent. Monats. v. p. 300 (1861), ♂; Reise der Novara, Lep. ii. p. 530, pl. 43. f. 3, 4.

Danais œnone, Butler, Proc. Zool. Soc. 1865, p. 433, pl. 25. f. 6, 1866, p. 56, ♂.

Hab. Philippine Islands.

3. Asthipa gloriola.

Danais gloriola, Butler, Proc. Zool. Soc. 1866, p. 56, pl. 4. f. 3, 4.

Danais citrina, Felder, Reise d. Nov. Lep. ii. p. 350, pl. 42. f. 5, 6, 7 (1867).

Hab. Aru Islands.

4. Asthipa schenkii.

Danais schenkii, Koch, Indo-Austr. Lep. Fauna, p. 107 (1865).

Hab. Solomon Islands.

Genus Parantica.

Parantica, Moore, Lep. of Ceylon, i. p. 7 (1880).

Danais (*Parantica*, sect. B), Marshall & de Nicéville, Butt. of India &c. p. 35.

Fore wing long, narrow, hind margin lengthened; first subcostal branch emitted at one fourth before end of the cell and touching the costal near its end, second branch from immediately before end of the cell; upper discocellular bent below the lower radial, producing a short discoidal spur within the cell from the angle, lower discocellular slender at its upper end; cell long and narrow. Hind wing somewhat elongated, exterior margin very convex, abdominal margin short, costal vein arched from the base and extending along edge of the costa; cell very long and narrow. Male with two spatula-shaped scent-pouches, one (the largest) being on the lower median vein, the other (about one fourth its size) on the submedian vein, near their ends, from which innumerable short white filaments project between the scales, each pouch showing on the underside by a slender swelling of the veins at that part. Antennæ with lengthened slender tip. Apical joint of the palpi short, small, pilose. Larva with two pairs of fleshy filaments.

Type *P. aglea*.

1. Parantica melanoides.

Danais aglea (part.), auctorum.

Danais (*Parantica*) *aglea*, Marshall & de Nicéville, Butt. of India &c. p. 38, pl. 6. fig. 7, ♂ ♀ (1882).

Larger than typical *P. aglea*; the markings broader and larger, and like those in *Caduga melaneus*: on the fore wing the discoidal streak broadly occupies the cell, and that beneath the cell has a central longitudinal line, not being divided as in *P. aglea*.

Expanse 3½ inches.

Hab. Himalayas, Mussoorie (*Hutton*); Cashmere (*Reid*); Nepal (*Ramsay*); Darjeeling; Cherra (*Atkinson*); Assam; Upper Tenasserim; Siam; Hainan Island; ? Formosa.

Tenasserim and Hainan specimens (males) are alike somewhat smaller than those from the Himalayas.

2. PARANTICA AGLEA.

Papilio aglea, Cramer, Pap. Exot. iv. pl. 377. fig. E (1782).

Danaida aglea, Aurivillius, Kongl. Vet.-Akad. Handl. 1882, p. 99.

Danais ceylanica, Felder, Verh. zool.-bot. Gesellsch. xii. p. 479 (1862).

Parantica ceylonica, Moore, Lep. of Ceylon, i. p. 8, pl. 2. f. 2, 2*a*.

Danais (*Parantica*) *ceylanica* et *grammica*, Marshall & de Nicéville, Butt. of India &c. pp. 39, 40 (1882).

Papilio similis (part.), Linn. Mus. Ulr. p. 299.

Hab. Southern India (Bombay, Malabar, Travancore, Bangolore); Ceylon.

Cramer cites Java and Coromandel as the localities of his *P. aglea*, but figures the male of the S. Indian form. The Javan form is *P. grammica*, Bd.

3. PARANTICA GRAMMICA.

Danais grammica, Boisduval, Spec. Gén. Lép. i. pl. xi. fig. 10, ♂ (1836).

Hab. Java. In coll. F. Moore.

4. PARANTICA AGLEOIDES.

Danais agleoides, Felder, Wien. ent. Monats. iv. p. 398 (1860); zool.-bot. Gesellsch. 1862, p. 486; Wood-Mason, Journ. Asiatic Soc. Bengal, 1881, p. 224; Distant, Rhop. Malayana, p. 15, pl. 1. fig. 5 (1882).

Danais (*Parantica*) *agleoides*, Marshall & de Nicéville, Butt. of India &c. p. 41.

Danais grammica, Doubleday, Diurnal Lep. p. 92; Moore, Catal. Lep. Mus. E.I. C. i. p. 122; Butler, P. Z. S. 1866, p. 55.

Hab. British Burmah (Rangoon, Mergui); Malay peninsula; Nicobars; Java (*Horsf.*); Sumatra.

5. PARANTICA ERYX.

Papilio eryx, Fabricius, Ent. Syst. Supp. p. 423 (1789).

Danais eryx, Butler, Catal. Fabrician Lep. B. M. p. 7, pl. 1. f. 2 (1870).

Hab. Borneo.

MANGALISA, n. g.

Fore wing triangular, costa much arched towards apex; upper discocellular bent below the lower radial and emitting a short spur within the cell from the angle. Hind wing oval; male with one scent-pouch on submedian vein, composed of the dilated or swollen vein and adjacent spatula-shaped patch, also a half spatular patch between it and the lower median vein, but no swelling of the vein or corresponding half of the patch on its other side. Venation similar to *Caduga*. Antennæ with a gradually thickened blunt club. Palpi large; apical joint very long, pointed, pilose.

MANGALISA ALBATA.

Euplœa albata, Zinken-Sommer, Nova Acta Acad. Curios. 1831, p. 181, pl. 16. f. 16.

Hab. Java.

Sexual mark on submedian and internal veins.

CADUGA, n. g.

Danais (*Chittira*, sect. A, part.), Marshall & de Nicéville, Butt. of India &c. p. 42 (1882).

Fore wing elongated, narrow, more regularly triangular; first subcostal branch emitted at one fourth before end of the cell, free; second branch from end of the cell; cell long and narrow; upper discocellular bent below lower radial, producing a short spur from the angle within the cell; lower discocellular slender at its upper end. Hind wing elongated, abdominal margin short, costa straight; costal vein long, slightly curved and extending along the margin; cell long and narrow. Male with two spatula-shaped pouch-marks, one, the largest, being on the submedian vein, the other on the internal vein, near the end; these pouch-marks are formed by a lengthened but slight dilatation or swelling of the veins, the adjacent spatula-shaped surface being composed of very compactly disposed scales of a different shape and form, (? between) which project innumerable delicate short white filaments; a similar patch of scales is also observable on the lower median vein, but it is not accompanied by the swollen vein. Antennæ with a regularly formed clavate tip. Apical joint of palpi large, stout, pointed.

Type *C. tytia*, Gray.

1. CADUGA TYTIA.

Euplœa tytia, Gray, Lep. Ins. of Nepal, p. 9, pl. 9. fig. 2 (1833).

Danais tytia, Doubleday, List. Lep. Brit. Mus. i. p. 50 (1844); Doubleday & Hewitson, Diurn. Lep. pl. 12. fig. 4.

Danais (*Chittira*) *tytia*, Marshall & de Nicéville, Butt. of India &c. p. 42 (1882).

Danais sita, Kollar, Hügel's Kaschmir, iv. p. 424, pl. 6 (1844).

Hab. N.W. and E. Himalayas (Cashmir to Sikkim); Khasia hills; Tenasserim.

2. CADUGA NIPHONICA, n. sp.

Differs from typical *C. tytia* in its larger size: fore wing very black, with broader subapical streaks; comparatively smaller and more ovate upper discal spots; the lower discal outer spot also smaller, the latter being more transversely narrow and less quadrate in shape; the submarginal row of spots are larger, and the marginal row more distinct: hind wing in male with all the veins and their borders blackish, the spatular glandular patch and streaks therefrom very black; no red bifid streak within the cell, which is replaced by a very indistinct slender grey line; the marginal spots are more or less obsolete.

Expanse, ♂ 4¼, ♀ 3¾ inches.

Hab. Japan (*Nikko*). In coll. British Museum.

A specimen of a female in my own collection, from North Formosa, agrees very nearly with the species from Japan. Mr. W. B. Pryer collected specimens of what may probably be this species in Chekiang, North China.

3. Caduga loochooana, n. sp.

Female. Duller-coloured than Japanese or Formosan specimens: fore wing pale brown; the subapical spots shorter, the discal spots regularly quadrate in shape, the submarginal series being disposed in a more regular linear row and transversely narrower: hind wing paler, but of a brighter red; the cell cleft by a distinct straight red streak starting directly from the discocellular veinlet.

Expanse, ♀ 3⅘ inches.

Hab. Loo Choo Islands. In coll. British Museum.

4. Caduga swinhoei, n. sp.

Differs from *C. melaneus* in its shorter and comparatively more regularly triangular fore wing and shorter hind wing, the markings being of a decidedly darker tint of blue; they are similar on both wings, but smaller, narrower, and with broader black interspaces; on the underside the hind wing is of a chestnut-red colour.

Expanse 3½ inches.

Hab. North Formosa (*R. Swinhoe*). In coll. F. Moore.

5. Caduga melaneus.

Papilio melaneus, Cramer, Pap. Exot. i. pl. 30. f. D (1775).

Danais melaneus, Godart, Enc. Méth. ix. p. 192.

Danais melaneus (part.), Distant, Rhop. Malayana, p. 14.

Euplœa melanea, Zinken-Sommer, Nova Acta Acad. Cur. Nat. 1831, p. 179.

Danais (*Chittira*) *melaneus*, Marshall and de Nicéville, Butt. of India &c. p. 43, pl. 5. f. 5, ♂ ♀.

Hestia ephyre, Hübner, Verz. bek. Schmett. p. 15 (1816).

Hab. Eastern Himalayas; Nepal (*Ramsay*); Darjiling (*Atkinson*); Sylhet; Khasia hills; British Burmah; Malay peninsula; Penang; Singapore.

6. Caduga pseudomelaneus, n. sp.

Differs from Malay specimens of *C. melaneus* in the fore wing having the upper elongated discal streak shorter, the upper discal spot larger, the two middle spots also larger, the two lowest more quadrate, the outer spot being excavated on its exterior edge, and the posterior streak below the cell shorter and traversed by a slender black streak: hind wing with the inner discal series of spots smaller, leaving a wider discal interspace between them and the marginal row, which are also smaller; the cell is also traversed by a black bifid line.

Expanse $3\frac{1}{4}$ inches.

Hab. Java. In coll. H. G. Smith.

An intermediate form between *C. melaneus* and *C. larissa.*

7. CADUGA LARISSA.

Danais larissa, Felder, Novara-Reise, Lep. ii. p. 349 (1867).

Hab. Java (*Horsfield*). In colls. British Museum and F. Moore.

8. CADUGA BANKSII, n. sp.

Danais melaneus, Distant, Rhop. Malayana, pl. 1. f. 6?

Much larger than the Javan *C. larissa*: all the markings comparatively narrower, thus giving wider interspaces; on the fore wing the subapical streaks are one third longer; on the hind wing the streaks are conspicuously narrower, and the discoidal streak has a well-formed forked central line.

Expanse, ♂ $3\frac{1}{2}$, ♀ $3\frac{3}{4}$ inches.

Hab. Sumatra. In colls. F. Moore and H. S. Smith.

A faded specimen of this species is in the Banksian collection at the British Museum. Has also been collected in Sumatra by Mr. Carl Bock.

9. CADUGA LUZONENSIS.

Danais luzonensis, Felder, Wien. ent. Monats. 1863, p. 106.

Danais erebus, Butler, Proc. Zool. Soc. 1866, p. 54, f. 3.

Hab. Philippines (Luzon, Bohol, Mindanao).

10. CADUGA NILGIRIENSIS.

Danais nilgiriensis, Moore, Ann. Nat. Hist. ser. 4, vol. xx. p. 44 (1877).

Danais (*Chittira*) *nilgiriensis*, Marshall and Nicéville, Butt. of India &c. p. 43, pl. 6. f. 9 ♂ (1882).

Hab. Southern India (Nilgiri hills).

Genus CHITTIRA, Moore.

Chittira, Moore, Lep. of Ceylon, i. p. 8 (1880).

Danais (*Chittira*), sect. B. part., Marshall and de Nicéville, Butt. of India &c. p. 42 (1882).

Fore wing somewhat short and broad; costa much arched; hind margin long; discocellulars bent in the middle below the lower radial, and producing a short spur within the cell from the angle; hind wing broadly oval, very convex exteriorly. *Male* with two scent-pouches, one on the submedian vein composed of the dilated or swollen vein and spatula-shaped adjacent patch, the other on the internal vein, which is there dilated but without any adjacent patch. Venation similar to *Caduga*. Antennæ with a tolerably thick club. Palpi large; third joint pointed, pilose.

CHITTIRA FUMATA.

Danais fumata, Butler, Proc. Zool. Soc. 1866, p. 53.

Chittira fumata, Moore, Lep. of Ceylon, i. p. 9, pl. 4. f. 1.

Danais taprobana, Felder, Reise d. Novara, Lep. ii. p. 349, pl. 42. f. 4 (1867).

Danais (*Chittira*) *taprobana*, Marshall and de Nicéville, Butt. of India &c. p. 44 (1882).

Hab. Ceylon.

May 1, 1883.

Prof. Flower, LL.D., F.R.S., President, in the Chair.

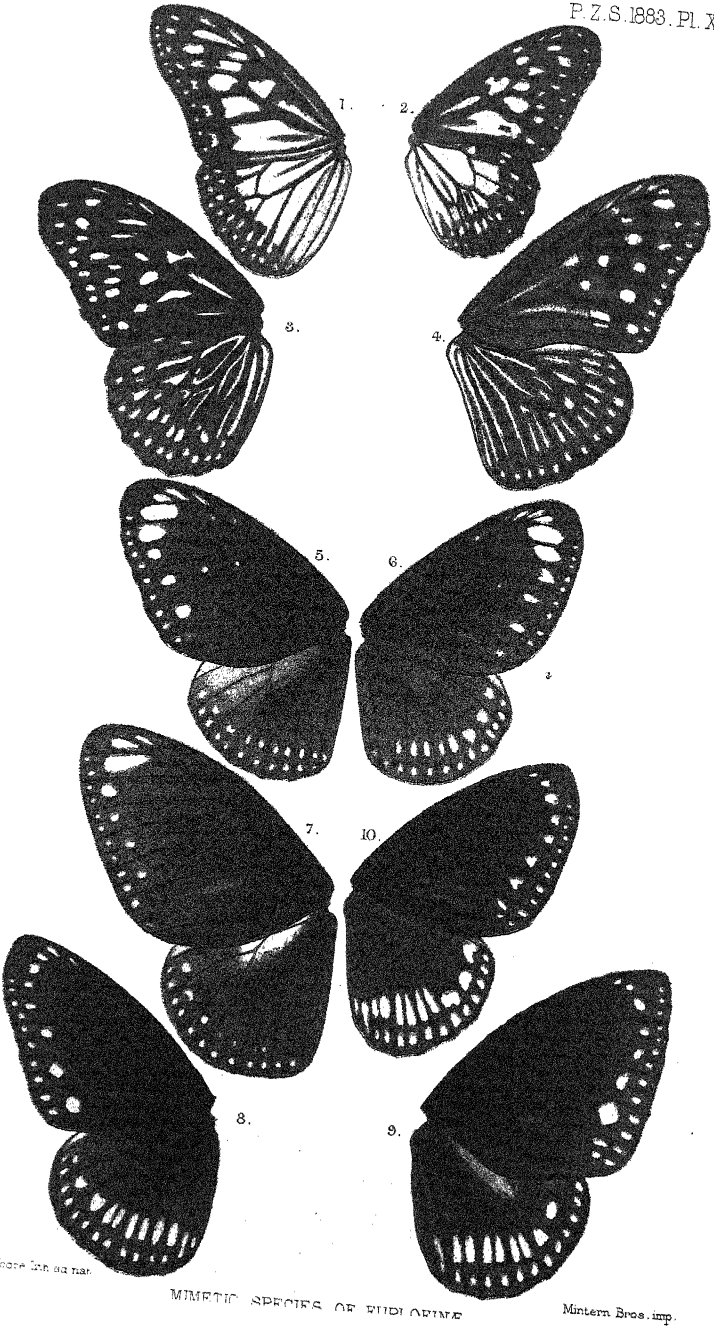
The Secretary read an extract from a letter addressed to him by Mr. W. L. Crowther, C.M.Z.S., dated Hobart Town, February 23, 1883.

In reply to inquiries addressed to him as to the possibility of obtaining living specimens of the Thylacine (*Thylacinus cynocephalus*), Mr. Crowther stated that the animal was certainly not yet extinct. The hawkers from the interior of the colony frequently offered its skins for sale in Hobart Town, thus showing that the skin-men with whom they deal were acquainted with the localities where they are still found. Mr. Crowther promised to use his best endeavours to obtain specimens for the Society.

The Secretary exhibited on behalf of Mr. H. Whitely the skin of a rare Bird of Paradise (*Rhipidornis gulielmi-tertii*). This specimen had been received in a collection which had been made in the island of Waigiou. So far as was known, this was only the fourth example of this species which had ever been obtained. The type specimen from which the figure in Gould's 'Birds of New Guinea' had been taken was in the Museum of Warsaw.

In reference to Dr. Meyer's communication (P. Z. S. 1882, p. 688) on the desirability of adopting a standard of nomenclature for the description of the colours of natural objects, and Mr. Harting's previous communication on the same subject (P. Z. S. 1882, p. 391), the Secretary laid upon the table a copy of Radde's 'Internationale Farbenskala,' which had been recently added to the Society's Library, and explained the way in which it was intended to be used.

The following papers were read :—



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MIMETIC SPECIES OF EUPLOEINÆ

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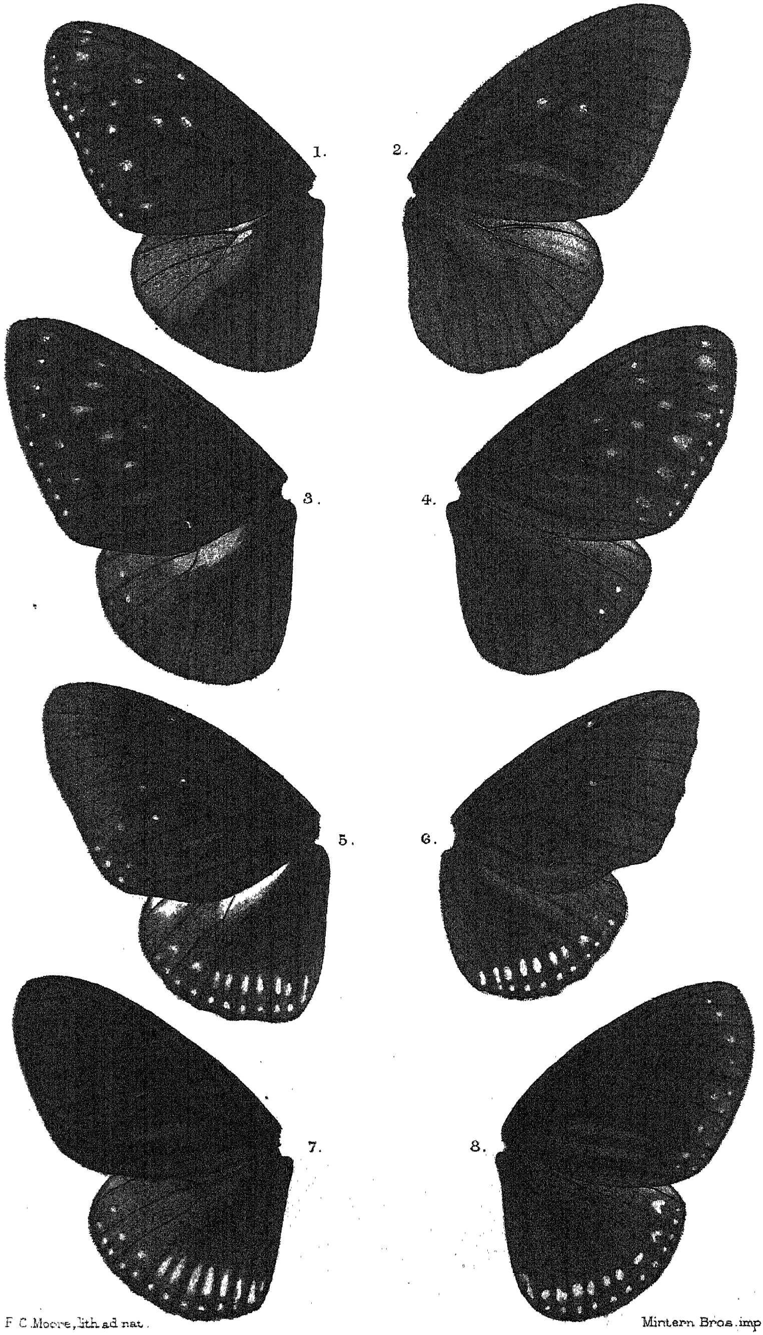

F. C. Moore, lith. ad nat.

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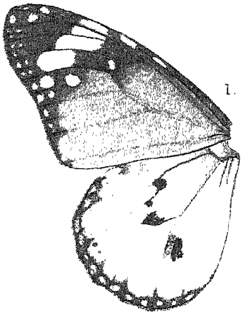
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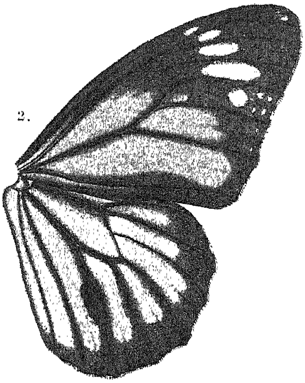
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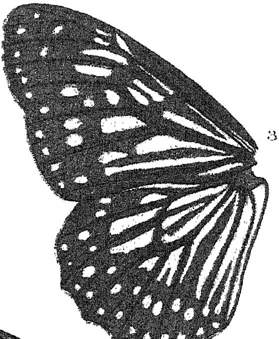
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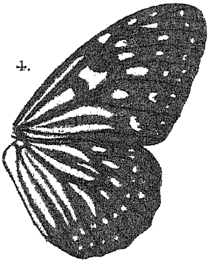
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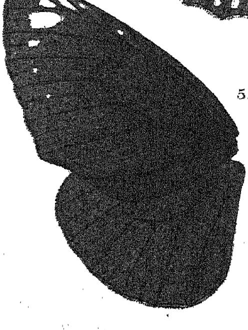
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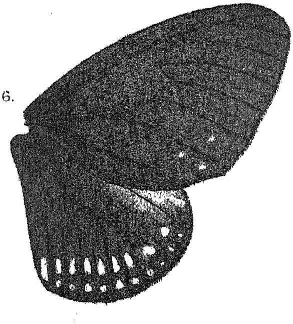
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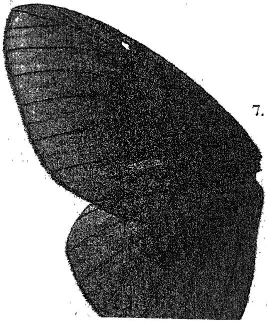
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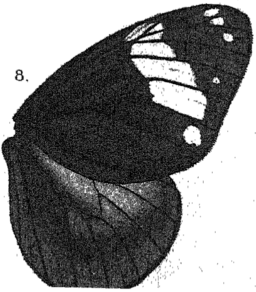
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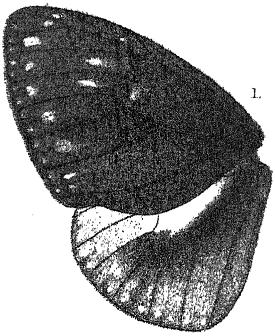
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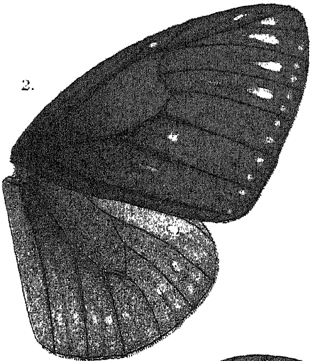
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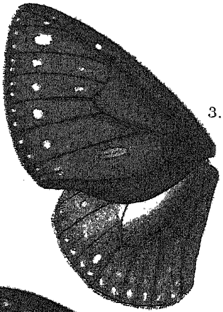
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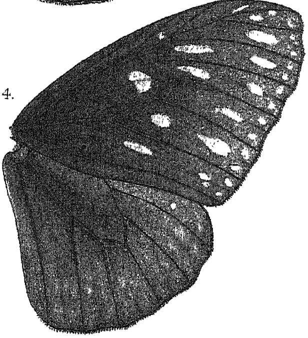
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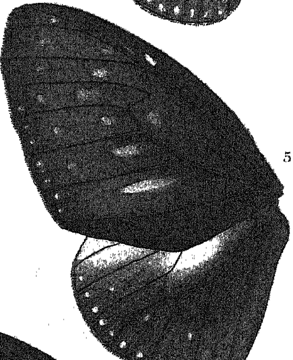
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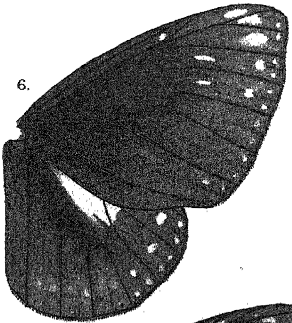
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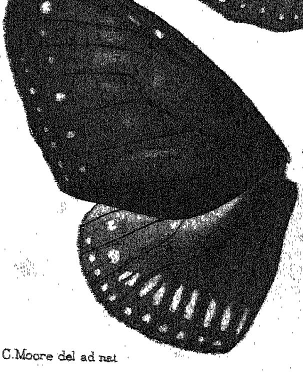
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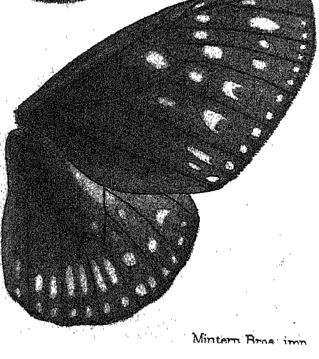
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C. Moore del ad nat

Mintern Bros. imp

1. A Monograph of *Limnaina* and *Euplœina*, two Groups of Diurnal Lepidoptera belonging to the Subfamily Euplœinæ; with Descriptions of new Genera and Species. By F. Moore, F.Z.S., A.L.S., &c.

Part II. *Euplœina.*

(Plates XXIX.–XXXII.)

Group EUPLŒINA.

Males, in most genera, possessed with either one or two glandular streaks or scent-producing organs on the fore wing, or with such an organ absent or present on the fore wing, and also a glandular patch on the costal border of the hind wing. No precostal cell on hind wing. Abdomen furnished with odoriferous anal tufts. Larva smooth, with four pairs of subdorsal long slender fleshy processes.

A. *No "sexual mark" or scent-producing organ on fore wing* (see Table, pp. 254, 255).

Genus HAMADRYAS.

Hamadryas[1], Boisduval, Voy. Astrolabe, Lép. p. 91 (1832); Doubleday & Hewits. D. Lep. p. 134.

Aeria (part.), Hübner, Verz. bek. Schmett. *p*. 9.

Wings small: fore wing elongated; costa much arched, apex convex; exterior margin short, slightly oblique and convex; posterior margin long, recurved; cell long, extending two thirds the wing; first subcostal at one third before end of the cell, second from near the end, third trifid; upper discocellular bent inward close to the subcostal, and outward before the middle, emitting a short spur within the cell from lower angle, lower discocellular curved obliquely outward; upper radial from angle near subcostal, lower from below the angle of the discocellulars; upper median at one fifth, lower at before end of the cell; submedian much recurved, with a short slender veinlet emitted from below near the base. Hind wing very short, oval; costa slightly arched at base; first subcostal at one seventh before end of the cell; upper discocellular shortest, outwardly curved, lower outwardly recurved, radial from their angle; upper median at one fourth, lower at one half before end of the cell; cell broad, lengthened triangular; submedian and internal veins recurved. Legs very long, slender, fore tarsi of female tumid and acutely spined at apex; palpi ascending, laxly scaly; antennæ long, gradually thickening to a lengthened club.

Type *H. zoilus*.

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[1] Previously used by Hübner (Tentamen, i., 1806).

KEY TO THE GENERA OF EUPLŒINA.

	Sexual mark or scent-producing organ	Exterior margin of fore wing	Posterior margin of fore wing	Upper discocellular vein	Lower discocellular vein	Discoidal veinlet in fore wing	Typical genera and species.
A.	*No "sexual mark" or scent-producing organ on fore wing.*						
	none.	convex.	recurved.	bent.	perfect.	from upper discocellular.	Hamadryas zoilus.
	ditto.	straight.	straight.	ditto.	ditto.	ditto.	Vonona goudotii.
	ditto.	uneven.	ditto.	ditto.	ditto.	ditto.	Nipara helcita.
	ditto.	ditto.	very convex.	ditto.	ditto.	ditto.	Oranasma lugens.
	ditto.	even.	slightly convex.	ditto.	ditto.	ditto.	Patosa funerea.
	ditto.	ditto.	straight.	ditto.	ditto.	ditto.	Sarobia grayi.
	ditto.	convex.	nearly straight.	ditto.	ditto.	ditto.	Vadebra climene.
	ditto.	ditto.	straight.	ditto.	ditto.	ditto.	Lontara wallacei.
	ditto.	uneven.	very convex.	ditto.	ditto.	ditto.	Gamatoba occulta.
	ditto.	even.	ditto.	ditto.	ditto.	ditto.	Menama camaralzeman.
	ditto.	uneven.	ditto.	ditto.	ditto.	ditto.	Trouga crameri.
	ditto.	ditto.	slightly convex.	straight.	ditto.	from middle of discocellulars.	Sabanosa cratis.
	ditto.	ditto.	very convex.	bent.	ditto.	from upper discocellular.	Adigama ochsenheimeri.
B.	*One "sexual mark" or scent-producing organ on fore wing.*						
	one on fore wing, short, slender.	uneven.	very convex.	bent.	perfect.	from upper discocellular.	Chanapa corinna.
	ditto.	ditto.	convex.	ditto.	ditto.	ditto.	Mahintha subdita.
	ditto.	ditto.	almost straight.	ditto.	ditto.	ditto.	Crastia core.
	short.	even.	slightly convex.	ditto.	ditto.	ditto.	Deragena proserpina.
	short, broad.	slightly convex.	ditto.	ditto.	ditto.	ditto.	Chirosa brenchleyi.
	long, slender.	uneven.	ditto.	ditto.	ditto.	ditto.	Pramesta tobleri.
	ditto.	ditto.	broadly convex.	ditto.	ditto.	ditto.	Karadira andamanensis.
	long, broad.	slightly concave.	slightly convex.	ditto.	ditto.	ditto.	Andasena swainsonii.
	ditto.	slightly convex.	convex.	ditto.	ditto.	ditto.	Bibisana horsfieldii.
	ditto.	ditto.	ditto.	ditto.	ditto.	ditto.	Betanga megæra.
	ditto.	convex.	very convex.	ditto.	ditto.	ditto.	Pramasa mitra.
	ditto.	ditto.	ditto.	ditto.	ditto.	ditto.	Rasuma violetta.
	ditto.	uneven.	convex.	ditto.	ditto.	ditto.	Tagata objecta.
	long, very broad.	convex.	ditto.	ditto.	ditto.	ditto.	Penoa alcathoe.
	ditto.	ditto.	ditto.	ditto.	ditto.	ditto.	Mestapra fraudulenta.

C. *No "sexual mark" on fore wing. Hind wing with a glandular patch.*

Glandular patch on hind wing	Ext. margin of fore wing	Post. margin of fore wing	Upper discocellular vein	Lower discocellular vein	Discoidal veinlet in fore wing	Typical genera and species.
small.	slightly convex.	convex.	bent.	perfect.	from upper discocellular.	Glinama euctemon.
ditto.	uneven.	slightly convex.	ditto.	ditto.	ditto.	Trepsichrois linnæi.
moderate.	convex.	convex.	concave.	ditto, concave.	none.	Calliplœa darchia.
large.	ditto.	very convex.	ditto.	ditto.	none.	Euplœa corus.

D. *One "sexual mark" on fore wing. Hind wing with a glandular patch.*

Sexual mark on fore wing	Glandular patch on hind wing	Ext. margin of fore wing	Post. margin of fore wing	Discocellular veins	Discoidal veinlet in fore wing	Typical genera and species.
small.	large.	oblique.	slightly convex.	concave, perfect.	none.	Satenga eupator.
short.	small.	ditto.	ditto.	ditto.	none.	Tabada hyacintha.
short, broad.	ditto.	convex.	ditto.	ditto.	none.	Danisepa rhadamanthus.
ditto.	large.	ditto.	ditto.	ditto.	none.	Selinda mniszechi.
short, oval.	ditto.	ditto.	very convex.	ditto.	none.	Hirdapa usipetes.
short.	ditto.	ditto.	ditto.	ditto.	none.	Salpinx nemertes.
ditto.	ditto.	oblique.	convex.	ditto.	none.	Pademma klugii.
small.	ditto.	ditto.	convex at base.	upper bent; perfect.	from upper discocellular.	Saphara treitschkei.
long.	ditto.	ditto.	convex.	ditto.	ditto, short.	Isamia superba.
slender.	ditto.	ditto.	ditto.	ditto.	ditto.	Nacamsa simillima.
slender, slightly defined.	ditto.	ditto.	ditto.	ditto.	ditto, long.	Tiruna roepstorffii.
short, broad.	small.	ditto.	very convex.	ditto.	ditto.	Anadara gamelia.

E. *Two "sexual marks" or scent-producing organs on fore wing.*

Sexual marks on fore wing	Ext. margin of fore wing	Post. margin of fore wing	Discocellular veins of fore wing	Discoidal veinlet of fore wing	Typical genera and species.
long.	oblique.	short.	bent in middle.	from middle of discocellulars.	Doricha sylvester.
ditto.	ditto.	slightly convex.	upper bent.	from upper discocellular.	Narmada coreoides.
long, broad.	convex.	convex.	ditto.	ditto.	Stictoplœa gloriosa.

Note. Certain species of *Hamadryas* are mimicked in New Zealand, Australia, and in the Malay islands by species of the genus *Neptis*; and it is a curious fact that *Neptis* (*Phædyma*) *shepherdi*, an Australian species, with *N. cerne*, *N. heliodora*, and *N. latifasciata*, approach considerably in form and pattern of markings to the South-American Heliconid *Tithorea bonplandii*. This resemblance of the Australian *Neptis* to *Tithorea* has suggested to me that we may expect to find in this region a nearer connecting form between the Euplœina and Heliconids than *Hamadryas*.

Hamadryas is apparently an isolated genus, having, so far as I know, no eastern very closely allied forms. It has great resemblance to some forms of South-American Ithomias (genus *Leucothyris*, &c.).

1. HAMADRYAS ZOILUS.

Papilio zoilus, Fabricius, Syst. Ent. p. 480 (1775); Mant. Ins. p. 25; Ent. Syst. iii. p. 42.

Hamadryas zoilus, Boisd. Voy. Astrolabe, Lép. p. 91; Doubleday & Hewits. D. Lep. pl. 18*. f. 1; Butler, Catal. Fabrician Lep. B. M. p. 128; Semper, Mus. Godeffroy, xiv. Lep. p. 143.

Hab. Cape York; Barnard Isle, Australia; New Zealand.

2. HAMADRYAS NAIS.

Nymphalis nais, Guérin, Voy. Coquille, pl. 15. f. 3 (1829).

Hab. Aru Islands.

3. HAMADRYAS NEDUSIA.

Stalachtis nedusia, Hübner, Zutr. Exot. Schmett. fig. 799–800 (1832).

Hab. Dorey, New Guinea.

4. HAMADRYAS ASSARICA.

Papilio assarica, Cramer, Pap. Exot. iv. pl. 363. f. A, B (1781).

Aeria asarica, Hübner, Verz. bek. Schmett. p. 10.

Heliconia assarica, Godart, Enc. Méth. ix. Suppl. p. 816.

Hab. N. Ceram; Amboina.

5. HAMADRYAS ÆQUICINCTA.

Hamadryas æquicinctus, Salvin & Godman, Proc. Zool. Soc. 1877, p. 142.

Hab. Duke-of-York Island.

6. HAMADRYAS MOOREI.

Hamadryas moorei, Macleay, Proc. Ent. Soc. N. S. Wales, i. p. 53 (1866).

Hab. Cape York, N. Australia.

VONONA, n. g.

Male. Fore wing triangular; costal margin arched, apex very acute; exterior margin oblique, nearly straight; posterior margin straight. Hind wing with somewhat prolonged anterior margin; exterior margin convex; upper discocellular with a short spur or discoidal veinlet emitted within the cell. Larva with four pairs of fleshy filaments.

Type *V. goudotii.*

1. VONONA GOUDOTII.

Euplœa goudotii, Boisduval, Faune Ent. Madagascar, Bourbon et Mauritius, p. 36, pl. 3. f. 2 (1833); Trimen, Rhop. Africæ austr. p. 83; Guénée, Lép. Maillard's Réunion, p. 8 (1867).

Crastia goudotii, Butler, Journ. Linn. Soc., Zool. xiv. p. 298.

Hab. Bourbon (*Boisduval*); Madagascar (*Brit. Mus. coll.*).

The habitat "Zulu, S. Africa," cited by Mr. Trimen in his 'Rhop. Africæ austr.,' on the authority of a specimen from that locality being in the British-Museum collection, is an error. The specimens in that collection are labelled "Madagascar."

2. VONONA EUPHON.

Papilio euphon, Fabricius, Ent. Syst. Suppl. p. 423 (1798)

Euplœa euphon, Butler, Catal. Fabr. Lep. B. M. p. 3.

Danais euphone, Godart, Enc. Méth. ix. p. 181.

Euplœa euphone, Boisduval, Faune Ent. Madag. Bourb. et Maurit. p. 36, pl. 3. f. 1 (1833); Lucas, Hist. Nat. Anim. Art. iii. p. 434, pl. 9. f. 1.

Stictoplœa euphon, Butler, Journ. Linn. Soc., Zool. xiv. p. 303.

Hab. Mauritius (*Brit. Mus.*).

3. VONONA DESJARDINSI.

Danaida (*Euplœa*) *desjardinsii*, Guérin, Icon. Règ. Anim., Ins. texte p. 474 (1844), ♂.

Hab. Rodriguez.

The type specimen of this species is in the "Hewitson" collection at the British Museum. It is similar to *V. euphone*, smaller, and of a uniform cupreous-brown colour, the markings on the fore wing smaller and much less prominent, the band on the hind wing less distinct and narrow, being only half the width, the marginal spots nearly obsolete. Expanse 2¼ inches.

NIPARA, n. g.

Male. Fore wing triangular, costal margin arched, exterior margin truncated at the apex, angularly excavated in the middle and waved hindward; posterior margin straight; upper discocellular with a short spur emitted within the cell, above the lower radial; submedian with a short slender veinlet emitted from below near the base. Hind wing obovate; exterior margin sinuous.

Type *N. helcita.*

1. NIPARA HELCITA.

Euplœa helcita, Boisduval, Bull. Soc. Ent. France, 1859, p. 156, ♂; Butler, P. Z. S. 1866, p. 453; id. Journ. Linn. Soc., Zool. xiv. p. 299.

Euplœa montrouzieri, Felder, Reise Novara, Lep. ii. p. 345 (1867).

Hab. New Caledonia; Navigators' Islands.

2. NIPARA DISTINCTA.

Euplœa distincta, Butler, Proc. Zool. Soc. 1874, p. 278; id. Journ. Linn. Soc., Zool. xiv. p. 299.

Euplœa eleutho, var., ♀, Herr.-Schäffer, Stett. ent. Zeit. 1869, pl. 2. f. 7, ♂; id. Exot. Schmett. ii. (1869), f. 107, ♂.

Hab. Ellice Islands.

3. NIPARA INTERMEDIA, n. sp.

Male. Intermediate between *N. perryi* and *N. distincta.* Fore wing with similar markings to *N. perryi*, but less distinct, and the discal spot only half the size: hind wing with a submarginal row of large spots, the three upper spots being obconic, the four lower a lengthened oval; a marginal row of very small spots.

Female. Fore wing with larger spots, similar to those in *N. helcita*: hind wing similarly marked to the male, but with six oval spots in the submarginal row.

Expanse, ♂ 2 $\frac{8}{10}$, ♀ 2 $\frac{5}{10}$ inches.

Hab. Raratonga Island. In coll. British Museum.

4. NIPARA INDISTINCTA, n. sp

Male. Nearest allied to *N. perryi.* Of a darker brown colour; fore wing with a very indistinct small whitish costal spot, an upper subapical spot, a discal spot, and a submarginal spot below it: hind wing with a submarginal and marginal row of very minute white spots.

Expanse 2$\frac{6}{10}$ inches.

Hab. Raratonga Island. In coll. British Museum.

5. NIPARA PERRYI.

Euplœa perryi, Butler, Proc. Zool. Soc. 1874, p. 278, pl. 44. f. 1; id. Journ. Linn. Soc., Zool. xiv. p. 299.

Hab. Nieue or Savage Island.

6. NIPARA ESCHSCHOLTZII.

Euplœa eschscholtzii, Felder, Reise Novara, Lep. ii. p. 345; Butler, Journ. Linn. Soc., Zool. xiv. p. 299; H.-Schäff. Stett. ent. Zeit. 1869, p. 69, pl. 2. f. 9, ♀; id. Exot. Schmett. ii. f. 109, ♀ (1860).

Hab. Fiji Islands.

ORANASMA, n. g.

Differs from *Patosa* in the fore wing being much less triangular, narrower, the exterior margin more oblique and uneven, the posterior margin more convex in the middle; hind wing more triangularly oval.

1. ORANASMA LUGENS.

Euplœa lugens, Butler, Ann. Nat. Hist. ser. 4, xviii. p. 242 (1876).
Crastia lugens, Butler, Journ. Linn. Soc., Zool. xiv. p. 298.
Hab. New Guinea.

2. ORANASMA SMITHII, n. sp.

Male. Larger than *O. lugens*: fore wing with similar but larger-sized white submarginal spots, the lowest spot being of the same size as the one above it, and a marginal row of small white spots; hind wing with a submarginal row of similar but larger spots, and a marginal row of small spots. Underside marked as above, the fore wing also having a small bluish-white cell-spot and five slender discal spots; hind wing also with a similar cell-spot and discal series of spots.

Expanse 3⅜ inches.
Hab. New Guinea. In coll. H. G. Smith.

PATOSA, n. g.

Wings shorter and broader than in *Vadebra* (*Climena* group): fore wing with straighter costal margin, exterior margin less oblique; posterior angle rounded, and posterior margin slightly convex; cell broader; upper discocellular with a short spur emitted within the cell: hind wing broad; anterior margin straighter, exterior margin and anal angle more convex.

Type *P. funerea*.

1. PATOSA FUNEREA.

Crastia funerea, Butler, Journ. Linn. Soc., Zool. xiv. p. 298, ♂ ♀ (1878).
Hab. New Guinea (Port Moresby).

2. PATOSA SQUALIDA.

Crastia squalida, Butler, Journ. Linn. Soc., Zool. xiv. p. 298 (1878), ♂ ♀.
Hab. New Guinea (Port Moresby).

3. PATOSA RESARTA.

Euplœa resarta, Butler, Ann. Nat. to r. ser. 4, xviii. p. 241 (1876).
Crastia resarta, Butler, Journ. Linn. Soc., Zool. xiv. p. 298.
Hab. New Guinea (Port Moresby).

4. PATOSA BATESII.

Euplœa batesii, Felder, Reise Novara, Lep. ii. p. 331 (1867).
Crastia lapeyrousei, Butler, Journ. Linn. Soc., Zool. xiv. p. 299 (nec Boisd.).

Like *V. melina*, Godt. Upperside of the same colour, with the pale marginal fascia on the fore wing distinct, narrower, and not broadly curved at the anterior end; the pale outer margin of the hind wing narrower and extending more towards base of abdominal margin. Underside of a paler tint, with similar pale margins as above; fore wing with four very small bluish-white discal spots, but no elongated streak: hind wing with six small bluish-white spots.

Expanse 3$\frac{2}{12}$ inches.

Hab. Gilolo (*Felder*); Port Moresby, New Guinea (*Brit. Mus.*).

Sarobia, n. g.

Male. Fore wing lengthened triangular; costal margin very convex, apex slightly acuminate; exterior margin oblique, even, short; posterior margin straight. Hind wing triangular; anterior margin long, slightly convex, apex somewhat acuminate; exterior margin obliquely convex, even; abdominal margin short.

Type *S. grayi.*

1. Sarobia grayi.

Euplœa grayi, Felder, Reise Novara, Lep. ii. p. 346 (1867).
Crastia grayi, Butler, Journ. Linn. Soc., Zool. xiv. p. 299.
Hab. Aru Islands.

2. Sarobia confusa.

Euplœa confusa, Butler, Proc. Zool. Soc. 1866, p. 285, f. 3 p. 283.
Crastia confusa, Butler, Journ. Linn. Soc., Zool. xiv. p. 299.
Hab. Island of Waigiou, New Guinea.

Vadebra, n. g.

Crastia (part.), Hübner, Verz. bek. Schmett. p. 16 (1816).
Crastia, Butler, Journ. Linn. Soc., Zool. xiv. p. 297.

Male. With smaller and shorter triangular fore wing; exterior margin oblique, slightly convex, and nearly even; posterior margin almost straight. Upperside without markings.

Type *V. climena.*

1. Vadebra climena.

Papilio climena, Cramer, Pap. Exot. iv. pl. 389. fig. E, F (1782).
Crastia climena, Butler, Journ. Linn. Soc., Zool. xiv. p. 298.
Crastia limnoria, Hübner, Verz. bek. Schmett. p. 16 (1816).
Danais algea, Godart, Enc. Méth. ix. p. 178 (1819).
Euplœa climena, Semper, Mus. Godeffroy, xiv. p. 142 (1879).
Hab. Amboina, Ceram.

2. Vadebra sepulchralis.

Euplœa sepulchralis, Butler, Proc. Zool. Soc. 1866, p. 282, fig. 2, ♂.
Crastia sepulchralis, Butler, Journ. Linn. Soc., Zool. xiv. p. 298.
Euplœa servillei, Boisd. MS.
Hab. Java.

3. VADEBRA SIMULATRIX.

Euplœa (Crastia) simulatrix, Wood-Mason, Journ. Asiatic Society Bengal, 1881, p. 229, ♂.

Euplœa simulatrix, Wood-Mason, loc. cit. 1882, p. 15, pl. 3. f. 1, 2, ♂ ♀.

Euplœa (Crastia) simulatrix, Marshall & de Nicéville, Butt. of India, p. 76.

Hab. Great Nicobar.

4. VADEBRA ZINKENII.

Euplœa zinkenii, Felder, Reise Novara, Lep. ii. p. 335 (1867).

Hab. Amboina.

5. VADEBRA MELINA.

Danais melina, Godart, Enc. Méth. ix. p. 179 (1819).

Euplœa melina, Boisduval, Faune de l'Océanie, p. 89; Butler, Proc. Zool. Soc. 1866, p. 282. f. 1, ♂.

Crastia melina, Butler, Journ. Linn. Soc., Zool. xiv. p. 299.

Euplœa paykullii, Boisd. MS.

Euplœa redtenbacheri, Felder, Reise Novara, Lep. ii. p. 330 (1867).

Hab. Aru; Ceram.

6. VADEBRA HONESTA.

Crastia honesta, Butler, Ann. Nat. Hist. ser. 5, x. p. 39, ♀ (1882).

Hab. Solomon Islands.

7. VADEBRA CHAROX.

Euplœa charox, Kirsch, Mitth. Zool. Mus. Dresden, 1877, p. 115.

Hab. New Guinea (Mysore, Kordo). In coll. Godman and Salvin.

8. VADEBRA CORACINA.

Euplœa coracina, Hopffer, Stettin. ent. Zeit. 1874, p. 30.

Male. Upperside uniform violet-brown; without any markings. Underside paler: fore wing with a small white costal spot above end of the cell, three very slender short streaks beyond, near base of subcostals and upper radial, a spot at lower end of the cell, and two on the disk between the medians: hind wing with a small white spot at lower end of the cell, six smaller discal spots beyond, and a partly obsolete submarginal and marginal row of white dots.

Expanse $3\frac{3}{4}$ to 4 inches.

Hab. Celebes. In coll. H. G. Smith.

LONTARA, n. g.

Male and Female. Fore wing long; anterior margin much arched at the base, apex convex; exterior margin slightly oblique and convex, even; posterior margin long, straight. Hind wing prolonged at the apex, exterior margin even, slightly concave below the apex and convex in the middle; abdominal margin short. Antennæ with a gradually thickened blunt club.

LONTARA WALLACEI.

Euplœa wallacei, Felder, Wien. entom. Monats. iv. p. 231 (1860); Reise Novara, Lep. ii. p. 346, pl. 39. f. 5, 6 (1867).

Crastia wallacei, Butler, Journ. Linn. Soc., Zool. xiv. p. 299.

Euplœa felderi, Boisd. MS., ♂.

Hab. Batchian; Gilolo.

GAMATOBA, n. g.

Wings in male shorter than in typical *Vadebra*; fore wing broader, shorter, apex convex, exterior margin uneven, posterior margin very convex; hind wing shorter and broader.

Type *G. æthiops*.

1. GAMATOBA OCCULTA.

Euplœa occulta, Butler, Proc. Zool. Soc. 1877, p. 467.

Crastia occulta, Butler, Journ. Linn. Soc., Zool. xiv. p. 299.

Hab. New Guinea (Port Moresby).

2. GAMATOBA ÆTHIOPS.

Euplœa æthiops, Butler, Proc. Zool. Soc. 1866, p. 285, ♂.

Crastia æthiops, Butler, Journ. Linn. Soc., Zool. xiv. p. 299.

Hab. Waigiou.

3. GAMATOBA REAUMURI.

Euplœa reaumuri, Oberthür, Ann. Mus. Stor. Nat. Genova, xii. p. 457 (1878).

Hab. Dorey. In coll. C. Oberthür and British Museum.

4. GAMATOBA LATREILLEI.

Euplœa latreillei, Kirsch, Mitth. kön. zool. Mus. Dresden, 1877, p. 115, ♂.

Hab. New Guinea (Dorey). In coll. C. Oberthür.

5. GAMATOBA ALECTO.

Euplœa alecto, Butler, Proc. Zool. Soc. 1866, p. 275, ♂.

Crastia alecto, Butler, Journ. Linn. Soc., Zool. xiv. p. 298.

Hab. Ceram.

6. GAMATOBA MONILIFERA, n. sp.

Female. Ochreous violet-brown, darkest basally: fore wing with a submarginal row of eight ochreous-white spots curving outward from the costa, the fourth and fifth the largest, a marginal row of very small spots: hind wing with a submarginal row of distinct ochreous-white spots placed in a somewhat regular linear series from the anal angle, where they are oval, the others being rounded and the upper one minute; a marginal row of smaller spots. Underside paler; both rows of spots the same as above; fore wing also with a minute spot above end of the cell, one at lower end of the cell, and two beyond the end, and a long pale violaceous-white spot below the median: hind wing also with a small spot at lower end of the cell and a series of five spots beyond.

Expanse, ♀ $3\frac{3}{8}$ inches.

Hab. Thursday Island. In coll. British Museum.

7. GAMATOBA DIADEMA, n. sp.

Male. Dark purplish violet-brown, anal area of hind wing paler: fore wing with a curved subapical series of four small indistinct whitish-brown spots: hind wing with two marginal rows of more distinct small brownish-white spots. Underside—fore wing with the four subapical spots distinct and white, and three lower marginal dots, one also on the disk: hind wing with a minute white spot at lower end of the cell, and four on the disk beyond; marginal rows more distinct than above.

Female. Paler, and of a more ochreous violet-brown tint: fore wing with four distinct creamy-white upper submarginal spots, a small spot on the costa, one between upper and middle median veins, and a marginal row of minute spots: hind wing with a marginal and submarginal row of large distinct creamy-white spots.

Expanse, ♂ 3, ♀ $3\frac{1}{4}$ inches.

Hab. Port Moresby, New Guinea. In coll. G. Semper and H. G. Smith.

8. GAMATOBA NOX.

Euplœa nox, Butler, Proc. Zool. Soc. 1866, p. 278, ♂.
Crastia nox, Butler, Journ. Linn. Soc., Zool. xiv. p. 298.
Hab. Aru Islands.

9. GAMATOBA MELANCHOLICA.

Euplœa melancholica, Butler, Proc. Zool. Soc. 1866, p. 280, ♂.
Crastia melancholica, Butler, Journ. Linn. Soc., Zool. xiv. p. 298.
Euplœa harrisii, Boisd. MS., ♂.
Hab. Amboina. In coll. Godman and Salvin, and British Museum.

10. GAMATOBA CERBERUS.

Crastia cerberus, Butler, Ann. Nat. Hist. ser. 5, x. p. 40, ♂ ♀ (1882).
Hab. New Britain; New Ireland.

11. GAMATOBA SPICULIFERA, n. sp.

Male. Dark violet-brown: fore wings with a small greyish-white speckled spot at lower end of the cell, a minute costal spot above end of the cell, three small discal spots, and a submarginal upper row of six small dentate bluish-white spots. Underside paler: fore wing marked as above, the spots being more distinct; a short streak also between median and submedian; hind wing with a minute white dot at end of the cell, a slender streak below subcostal and two between the medians, also a submarginal row of three very minute dots.

Female. Paler; fore wing with similar but slightly larger-sized spots; hind wing with two or three indistinct whitish upper submarginal dots.

Expanse, ♂ $4\frac{1}{8}$, ♀ $4\frac{2}{5}$ inches.

Hab. Bouru (*Wallace*). In coll. H. G. Smith, and Hewitson (British Museum).

12. GAMATOBA EBENINA.

Euplœa ebenina, Butler, Proc. Zool. Soc. 1866, p. 301, ♂.
Crastia ebenina, Butler, Journ. Linn. Soc., Zool. xiv. p. 298.
Euplœa edwardsii, Boisd. MS.

Hab. Aru Islands.

MENAMA, n. g.

Euplœa (*Crastia*, sect. B), Marshall and de Nicéville, Butt. of India, p. 76 (1882).

Male. Fore wing very long, broad; costal margin slightly arched at base, apex somewhat acuminate; exterior margin very oblique, short; posterior margin very convex in middle; upper discocellular bent very obliquely inward and angled at its lower end, and emitting a short discoidal veinlet from the angle, lower bent obliquely outward: hind wing broad; exterior margin obliquely convex.

Female. Fore wing slightly convex below the apex; posterior margin straight.

Type *M. camaralzeman.*

1. MENAMA CAMARALZEMAN.

Euplœa camaralzeman, Butler, Proc. Zool. Soc. 1866, p. 271, pl. 29. f. 1, ♂.
Crastia camaralzeman, Butler, Journ. Linn. Soc., Zool. xiv. p. 298.
Euplœa (*Crastia*) *camaralzeman*, Marshall and de Nicéville, Butt. of India, p. 77 (1882).

Hab. Siam.

2. MENAMA MODESTA.

Euplœa modesta, Butler, Proc. Zool. Soc. 1866, p. 273, ♂.
Crastia modesta, Butler, Journ. Linn. Soc., Zool. xiv. p. 298.
Euplœa (*Crastia*) *modesta*, Marshall and de Nicéville, Butt. of India, p. 77 (1882).

Hab. Siam.

3. MENAMA CUPREIPENNIS.

Crastia cupreipennis, Moore, Proc. Zool. Soc. 1878, p. 823.
Euplœa (*Crastia*) *cupreipennis*, Marshall and de Nicéville, Butt. of India, p. 77 (1882).

Hab. Upper Tenasserim.

4. Menama tavoyana, n. sp. (Plate XXX. fig. 6, ♂.)

Comparatively larger than *M. modesta*; the outer margin of the wings is disinctly scalloped, in *M. modesta* they are almost even; fore wing in male much darker in colour, the basal four fifths dark pitchy brown, brilliantly glossed with steel-blue, with a distinct minute white spot between upper and middle median veins and a larger spot on costa. Hind wing pitchy brown basally, with a marginal and submarginal row of spots smaller than in *M. modesta.*

Female. Fore wing of the same dark colour, but less glossy blue surface: hind wing with both rows of marginal spots of the same size as in male.

Expanse, ♂ ♀ 3⅜ inches.

Hab. Tavoy, Tenasserim. In coll. F. Moore.

5. Menama buxtoni, n. sp.

Male. Fore wing violet-brown, washed with violet-blue uniformly throughout the surface to extreme outer margins. Hind wing paler, both rows of marginal spots smaller and of a uniform size, the inner row being disposed in a curve, not in a straight series as in *M. modesta.*

Expanse 3⅛ inches.

Hab. Sumatra (*Buxton*). In coll. F. Moore.

6. Menama lorzæ, n. sp. (Plate XXXI. fig. 5.)

Euplœa lorzæ, Boisduval, MS.

Male. Violet-brown: fore wing with a more or less violet-blue gloss in some lights suffusing the basal two thirds; a submarginal upper series of white spots similarly disposed to those in *Tronga crameri,* the three upper narrow, the first being very minute, the fourth largest, fifth smaller, sixth and seventh minute; three or four very minute upper marginal spots, and a minute spot also on the costa above end of the cell. Underside paler: fore wing spotted as above; also with two or three minute lower marginal spots, a bluish-white cell-spot and two on the disk beyond: hind wing with a bluish-white cell-spot and seven discal spots beyond, and a lower marginal series of small white spots.

Expanse 3¼ inches.

Hab. Sandakan, N. Borneo (*Pryer*). In coll. Godman and Salvin and C. Oberthür.

7. Menama mouhotii, n. sp. (Plate XXXI. fig. 6.)

Male. Ochreous brown, slightly tinged with olivaceous: fore wing with two very small indistinct whitish lower submarginal spots, and two similar marginal spots: hind wing with a submarginal row of nine large whitish spots, the seven lower oval, the two upper rounded; a marginal row of small round spots. Underside paler: fore wing with the two lower submarginal and marginal spots, a small spot at lower end of the cell, two beyond the cell, and a large one between middle and lower median veins: hind wing with marginal and submarginal spots as above, and five very small discal spots.

Expanse $3\frac{1}{4}$ inches.

Hab. Cambodia (*Mouhot*). In coll. Messrs. Godman and Salvin.

TRONGA, n. g.

Euplœa (*Crastia*, sect. C, part.), Marshall and de Nicéville, Butt. of India, p. 76 (1882).

Male. Fore wing broadly elongate, somewhat quadrate in form, the posterior margin being very broadly convex; cell much broader and with longer discocellulars than in *Vadebra*; upper discocellular with a short spur or discoidal veinlet emitted within the cell: hind wing with the apex and exterior margin more convex.

Type *T. crameri.*

1. TRONGA CRAMERI.

Euplœa crameri, Lucas, Rev. Zool. 1853, p. 318, ♂.

Euplœa crameri, Moore, Catal. Lep. Mus. E.I. C. i. p. 129 (1857), ♂.

Crastia crameri, Butler, Journ. Linn. Soc., Zool. xiv. p. 297.

Euplœa johanna, Kirby, Syn. Catal. D. Lep. p. 17 (1871).

Euplœa (*Crastia*) *crameri*, Marshall and de Nicéville, Butt. of India, p. 78, pl. 8. f. 15 (1882).

Female paler than male, and of a more olivaceous brown tint: fore wing with eight submarginal spots; a costal spot above end of the cell, one at lower end of the cell, and two discal beyond the cell: hind wing with two or three upper submarginal spots and indistinct discal and submarginal spots.

Hab. Borneo (*Lowe*). Colls. Paris Museum, British Museum, F. Moore, Salvin and Godman.

Having compared Lucas's type of *T. crameri* with the insect which I also described under the same name, I find that they are identical. The specimens in the East-India Company's Museum had been so labelled by Dr. Boisduval.

2. TRONGA BISERIATA, n. sp.

Allied to *T. crameri.*

Male. Uniform dark violet-brown, without gloss: fore wing with a marginal row of small very prominent white spots, which are obsolete at the apex, and a submarginal row of somewhat larger spots, which are obsolete at the lower end, the penultimate upper spot being the largest and oval; a small spot also on the disk between upper and middle median veins: hind wing with a marginal row of very prominent small white spots.

Expanse $3\frac{3}{8}$ inches.

Hab. Trinkut, Nicobar Islands. In coll. British Museum.

3. TRONGA MARSDENI, n. sp.

Intermediate between *T. bremeri* and *T. crameri.* Colour paler. Fore wing more the shape of that in *T. crameri*, being comparatively longer and narrower than in *T. bremeri*; the markings also are more like those in *T. crameri*, there being only two small upper submarginal spots, which, however, are more elongated and narrower; the next (or largest) spot is also much longer and narrower, the fourth smaller, and the lower three very small; the marginal row is distinct, but very small: hind wing with two rows of small distinct white spots.

Expanse $3\frac{1}{2}$ inches.

Hab. Singapore. In coll. F. Moore.

4. TRONGA BREMERI. (Plate XXIX. fig. 5, ♂.)

Euplœa bremeri, Felder, Wien. entom. Monats. iv. p. 398 (1860); Distant, Rhopalocera Malayana, p. 23, pl. 2. f. 4, ♂.

Crastia bremeri, Butler, Journ. Linn. Soc., Zool. xiv. p. 298 (1878).

Euplœa (Crastia) bremeri, Marshall and de Nicéville, Butt. of India, p. 79 (1882).

Hab. Malay peninsula, Malacca (Province Wellesley); British Burmah (Tavoy, Mergui).

Female. Slightly paler than in male, marked the same on both wings.

5. TRONGA OLIVACEA, n. sp.

Female. Pale olive-brown: fore wing with a very prominent small whitish costal spot above end of the cell, two on the disk, a submarginal series of nine spots, the three upper small and narrow, the fourth and fifth large and elongated, the others small but irregular in size, the eighth exceeding the other three in size; a marginal row of thirteen small spots: hind wing with a submarginal and marginal row of small prominent whitish spots. Underside paler, with all the markings as above; the fore wing also with a greyish streak between median and submedian, and hind wing with four small discal spots.

Expanse, ♀ $2\frac{7}{8}$ inches.

Hab. Minthantoung, Thoungyeen valley, Tenasserim (*Bingham*). In coll. W. L. Distant.

6. TRONGA MOOREI.

Euplœa moorei, Butler, Proc. Zool. Soc. 1866, p. 277, ♀ (nec Felder).

Crastia moorei, Butler, Journ. Linn. Soc., Zool. xiv. p. 298.

Smaller than *T. brookei*: fore wing with the submarginal spots more distinct and rounded, and the hind wing with a complete marginal row of small spots and a short upper submarginal row.

Expanse $3\frac{1}{8}$ inches.

Hab. Sumatra (*Brit. Mus.*); ? Borneo (*Pryer*). Coll. F. Moore.

7. TRONGA NIASICA, n. sp.

Dark violet-brown, inclining to black-brown: fore wing with a small white costal spot, two small slightly oval spots beyond upper end of the cell, a small discal spot beyond lower end of the cell, a submarginal series of eight spots, the three upper of which are small and slender, the fourth and fifth large and bluntly oval in shape, the three lower smaller and nearly round, a marginal row of small narrow spots, extending to the apex and disposed alternately against the margin and towards the submarginal row. Hind wing with a marginal row of very small dentate spots, and a nearly obsolete upper submarginal row.

Expanse, ♂ $3\frac{1}{8}$ inches.

Hab. Nias Island, W. coast of Sumatra. In coll. British Museum.

Approaches nearest to *T. biseriata.*

8. Tronga brookei, n. sp.

Allied to *T. bremeri.* Comparatively smaller and narrower; of a paler brown colour and with a violet-blue tint.

Male. Fore wing with similarly disposed spots, all of which are smaller, the marginal series being very minute, the four lower submarginal also very small and the upper ones half the size of those in *T. bremeri*; costal and (sometimes two) discal spots also small: hind wing with very minute or scarcely distinguishable marginal dots.

Female. Paler; marked as in male, and with an additional spot within the cell.

Expanse, ♂ $3\frac{4}{5}$, ♀ $3\frac{5}{8}$ inches.

Hab. Sarawak, Borneo (*Wallace*). In coll. British Museum.

9. Tronga labuana, n. sp.

Allied to *T. crameri.*

Male. Fore wing with eight similar but comparatively shorter and broader submarginal spots, the sixth and seventh lower spots being larger; an indistinct marginal lower row of very minute spots: hind wing with two complete series of small spots.

Female. Fore wing with somewhat larger submarginal and marginal spots, a small costal spot, one within the cell, and one on the disk: hind wing with two rows of spots as in male.

Expanse $3\frac{5}{8}$ inches.

Hab. Labuan, Borneo (*Lowe*). In coll. Messrs. Godman and Salvin.

10. Tronga daatensis, n. sp.

From typical *T. crameri* this differs on the fore wing in the subapical spots being comparatively broader and larger, three small lower spots occurring in the submarginal series, and in having a nearly complete marginal row of small distinct spots: hind wing with a marginal row of small distinct spots. Underside with all these spots more prominent, the marginal row larger, and the discal series of spots much larger than those in *T. crameri.*

Expanse, ♂ $3\frac{2}{4}$ inches.

Hab. Island of Daat, Labuan, Borneo. In coll. W. L. Distant.

11. **Tronga pryeri**, n. sp.

Near to *T. bremeri*, much darker-coloured.

Male. Fore wing with similarly disposed spots; the three upper submarginal smaller, the fourth and fifth shorter, the sixth, seventh and eighth, and the discal spot being larger: hind wing with two complete rows of larger-sized spots.

Female. Marked as in male, all the spots, however, being larger.

Expanse, ♂ 3½, ♀ 3¾ inches.

Hab. Sandakan, Borneo (*Pryer*). In coll. Godman and Salvin and W. L. Distant.

12. **Tronga kinbergi.**

Euplœa kinbergi, Wallengren, Wien. ent. Monats. iv. p. 35 (1860); id. Eugenies Resa, p. 352.

Crastia kinbergi, Butler, Journ. Linn. Soc., Zool. xiv. p. 297.

Hab. China. In coll. British Museum.

Sabanosa, n. g.

Fore wing somewhat broad; costal margin almost straight, apex produced; exterior margin oblique, slightly sinuous; posterior margin slightly convex. Hind wing broad, bluntly conical; exterior margin convex, slightly sinuous.

Sabanosa cratis.

Euplœa cratis, Butler, Proc. Zool. Soc. 1866, p. 297, fig. 1, ♂.

Crastia cratis, Butler, Journ. Linn. Soc. Zool. xiv. p. 297.

Hab. Philippines (Babuyanes).

Mr. Georg Semper tells me that the female of this insect is like the male, except that in the fore wing the posterior margin is not convex.

Adigama, n. g.

Crastia (part.), Butler.

Euplœa (*Crastia*, sect. C, part.); Marshall and de Nicéville, Butt. of India, p. 76 (1882).

Wings large, broad. Fore wing elongated, triangular; apex prolonged, exterior margin very oblique, waved; discocellulars bent in the middle above lower radial, emitting a short spur within the cell from the angle; male with the posterior margin very convex towards the angle: hind wing broad.

Type *A. ochsenheimeri* (Moore).

1. **Adigama malayica.**

Crastia malayica, Butler, Journ. Linn. Soc., Zool. xiv. p. 297 (1878).

Euplœa malayica, Distant, Rhopalocera Malayana, p. 22, pl. 2. fig. 7, ♂.

Euplœa (*Crastia*) *malayica*, Marshall and de Nicéville, Butt. of India, p. 79 (1882).

Hab. Malay peninsula, Penang, Singapore, Sumatra.

2. ADIGAMA OCHSENHEIMERI.

Euplœa ochsenheimeri, Moore, Catal. Lep. Mus. E.I. C. i. p. 132 (1857), nec Lucas.

Crastia ochsenheimeri, Butler, Journ. Linn. Soc., Zool. xiv. p. 297.

Euplœa (*Crastia*) *ochsenheimeri*, Marshall and de Nicéville, Butt. of India, p. 79 (1882).

Euplœa hübneri, Boisd. MS.

Hab. Java (*Horsf.*). Coll. British Museum.

3. ADIGAMA SCUDDERI.

Crastia scudderi, Butler, Journ. Linn. Soc., Zool. xiv. p. 297 (1878).

Hab. Borneo.

B. *One "sexual mark" or scent-producing organ on fore wing.*

CHANAPA, n. g.

Fore wing arched at the base, apex acute, exterior margin oblique and excavated in the middle; posterior margin in male very convex in the middle, and with a short slender sericeous brand or scent-producing organ. Hind wing subconical, exterior margin convex.

Type *C. corinna.*

1. CHANAPA CORINNA.

Danais corinna, Macleay, King's Australia, ii. p. 402 (1827).

Euplœa corinna, Butler, Journ. Linn. Soc., Zool. xiv. p. 299.

Hab. Australia (New Holland).

2. CHANAPA LEWINI.

Euplœa lewinii, Felder, Reise Novara, Lep. ii. p. 345 (1867).

Hab. Australia (Port Bowen; Champion Bay).

3. CHANAPA ANGASI.

Euplœa angasii, Felder, Reise Novara, Lep. ii. p. 343 (1867); H.-Schäff. Stett. ent. Zeit. 1869, p. 69, pl. 2. fig. 6, ♂; id. Exot. Schmett. ii. fig. 108, ♂ (1869); Semper, Mus. Godeffroy, xiv. p. 141 (1879).

Hab. Australia (Cape York; Moreton Bay).

ANDASENA, n. g.

Differs from typical *Penoa* in the fore wing being more pointed, the exterior margin longer and slightly concave in the middle, the sericeous band broader: hind wing more convex on the anterior margin and the exterior margin less convex.

Type *A. swainsoni.*

1. ANDASENA BELINDA.

Euplœa belinda, Butler, Journ. Linn. Soc., Zool. xiv. p. 299 (1878).

Euplœa orope, var., Butler, Proc. Zool. Soc. 1866, p. 299.

Hab. Sumatra.

2. ANDASENA BAUDINIANA.

Danais baudiniana, Godart, Enc. Méth. ix. p. 181 (1819).
Hab. Timor.

3. ANDASENA OROPE.

Euplœa orope, Boisduval, Voy. Astrol. Lép. p. 100 (1832); Spec. Gén. Lép. i. pl. ii. fig. 9 (1836); Butler, Proc. Zool. Soc. 1866, p. 299; Journ. Linn. Soc., Zool. xiv. p. 299.
Hab. Taiti (*Boisd.*); Timor (*Butler*).

4. ANDASENA SULUANA, n. sp.

Allied to *A. lucasii*. Smaller in size.

Male. Fore wing with the submarginal spots smaller and disposed in a more regular series, marginal spots and the costal spot minute: hind wing with both rows of spots very small, being of similar size to those in *A. swainsonii*.

Female. Fore wing with slightly larger submarginal spots; two small discal spots, a spot at lower end of the cell, and another on the costal border: hind wing with both rows of spots larger than in the male and similar in shape to those in *A. lucasii*.

Expanse ♂ 3, ♀ 3¼ inches.

Hab. Sulu archipelago (*Pryer*). In coll. Messrs. Godman and Salvin.

5. ANDASENA LUCASI, n. sp.

Euplœa lucasii, Boisduval, MS.

Allied to *A. swainsonii*. Fore wing of a less dark tint of colour; the sericeous streak of the same length but slightly narrower; the five submarginal apical spots half the size; the spot between middle and lower medians large and circular; a duplex spot also between lower median and submedian; an oval spot on the costa, and two more or less distinct spots on the disk. Hind wing with the inner row of spots of a lengthened oval shape and prominent, the upper second and third cordate.

Female marked as in male, all the spots somewhat larger.

Expanse 3¼ to 3½ inches.

Hab. Philippines (Mindanao). In colls. G. Semper, C. Oberthür, F. Moore.

6. ANDASENA SWAINSONII.

Danais swainsonii, Godart, Enc. Méth. ix. Suppl. p. 815 (1823).
Euplœa swainsonii, Butler, Journ. Linn. Soc., Zool. xiv. p. 299.
Hab. Philippines (Luzon).

7. ANDASENA DONOVANI.

Euplœa donovanii, Felder, Reise Novara, Lep. ii. p. 343 (1867), ♂.
Hab. Celebes.

8. ANDASENA ELEUTHO.

Danais eleutho, Quoy and Gaimard, Freycinet's Voy. p. 554, pl. 83. fig. 2 (1815); Godart, Enc. Méth. ix. p. 815; Boisduval, Voy. Astrolabe, Ent. p. 100.

Euplœa eleutho, Butler, Journ. Linn. Soc., Zool. xiv. p. 299.

Hab. Isle of Guam, Ladrone Islands; Samoa and Ellice Islands (B.M.).

DERAGENA, n. g.

From typical *Andasena* this differs in the fore wing being somewhat shorter and more convex at the apex, the sericeous brand only half the length, and the exterior margin more even: hind wing also with an even exterior margin.

Type *D. proserpina.*

1. DERAGENA CHILDRENI, n. sp.

Euplœa grayi, Boisduval, MS.

Upperside dark chocolate-brown, palest externally: fore wing with a submarginal apical series of very minute white dentate spots; sericeous streak five twelfths of an inch in length: hind wing with a submarginal upper series of very small white spots, and a smaller series of very indistinct marginal spots. Underside—fore wing with a more distinct submarginal row of dentate white spots and three minute bluish-white discal spots: hind wing with a submarginal and marginal upper series of distinct white spots, and a curved discal series of smaller bluish-white spots, one being within the cell.

Expanse $2\frac{7}{8}$ inches.

Hab. Java. In coll. Mons. C. Oberthür.

2. DERAGENA PROSERPINA.

Euplœa proserpina, Butler, Proc. Zool. Soc. 1866, p. 300, ♂; Journ. Linn. Soc., Zool. xiv. p. 300.

Euplœa herrichii, Felder, Reise Novara, Lep. ii. p. 344, pl. 39. figs. 3, 4 (1867).

Hab. Fiji Islands (Ovalau, Vanua Levu).

3. DERAGENA SCHMELTZII.

Euplœa schmeltzii, Her.-Schäffer, Stettin. ent. Zeit. 1869, p. 70, pl. 2. f. 8, ♀; Exot. Schmett. ii. f. 110 (1869); Butler, Journ. Linn. Soc., Zool. xiv. p. 300.

Hab. Samoa, Upolu, Lifu.

4. DERAGENA WHITMEI.

Euplœa whitmei, Butler, Ann. & Mag. Nat. Hist. ser. 4, xx. p. 349, ♀ (1877).

Hab. Royalty Islands (Lifu).

5. DERAGENA BOISDUVALII.

Euplœa boisduvalii, Lucas, Rev. Zool. 1853, p. 321.

Hab. Australia.

BIBISANA, n. g.

Fore wing in male prolonged and acuminate at the apex, exterior margin very oblique, hind margin broadly convex, with a lengthened broad sericeous brand.

Type *B. horsfieldii.*

1. BIBISANA HORSFIELDII.

Euplœa horsfieldii, Felder, Reise Novara, Lep. ii. p. 333, pl. 40. f. 4, ♂ (1867); Butler, Journ. Linn. Soc., Zool. xiv. p. 300.

Hab. Celebes.

2. BIBISANA LEACHII.

Euplœa leachii, Felder, Reise Novara, Lep. ii. p. 334, ♀ (1867).

Hab. Celebes. In coll. W. L. Distant.

3. BIBISANA DIANA.

Euplœa diana, Butler, Proc. Zool. Soc. 1866, p. 297, pl. 29. f. 6, ♂; id. Journ. Linn. Soc. Zool. xiv. p. 300.

Euplœa kirbyi, Felder, Reise Novara, Lep. ii. p. 334, ♂ ♀ (1867).

Hab. Celebes.

4. BIBISANA CONFIGURATA.

Euplœa configurata, Felder, Reise Novara, Lep. ii. p. 326, pl. 42. f. 1, 2, ♀ (1867).

Hab. Celebes.

BETANGA, n. g.

Fore wing shorter and comparatively more regularly triangular than in typical *Crastia* (*C. core*), the costa more arched, the posterior margin more convex, the sericeous brand much larger, broader, and longer.

Type *B. megæra.*

1. BETANGA SCHERZERI.

Euplœa scherzeri, Felder, Verh. zool.-bot. Gesell. xii. p. 479 (1862); Reise Novara, Lep. ii. p. 335 (1867); Moore, Lep. of Ceylon, i. p. 12 (1880); Marshall and de Nicéville, Butt. of India, p. 85 (1882).

Hab. Ceylon.

2. BETANGA WALLENGRENII.

Euplœa wallengrenii, Felder, Reise Novara, Lep. ii. p. 336 (1867); Butler, Journ. Linn. Soc., Zool. xiv. p. 300.

Hab. Java.

3. BETANGA MAURA.

Euplœa maura, Hopffer, Stettin. ent. Zeit. 1874, p. 32, ♂.

Hab. Celebes.

4. BETANGA ANTHRACINA.

Euplœa anthracina, Butler, Proc. Zool. Soc. 1866, p. 280, f. 1, ♂; Journ. Linn. Soc., Zool. xiv. p. 301.
Euplœa walkenaieri, Boisd. MS.
Hab. Amboina, Gilolo.

5. BETANGA DUPONCHELII.

Euplœa duponchelii, Boisduval, Voy. Astrol. Lep. p. 97 (1832); Butler, Journ. Linn. Soc., Zool. xiv. p. 301.
Euplœa geyeri, Boisd. MS.
Hab. Bouru, Ceram.

6. BETANGA DODINGENSIS, n. sp.

Euplœa moorei, Boisduval, MS.

Closely allied to *B. duponchelii*. Upperside of a more uniform colour: fore wing with a somewhat broader sericeous streak; no marginal pale spots: hind wing unspotted. Underside also of a more uniform colour: fore wing with four discal bluish-white spots, and two very minute costal dots: hind wing with a small bluish-white spot within the cell; a discal series of six spots, and an upper submarginal series of three or four spots.

Expanse 3¼ inches.

Hab. Dodinga. In colls. M. Oberthür and F. Moore.

7. BETANGA VITELLA.

Euplœa vitella, Montrouze, Ann. Soc. Phys. Nat. Lyon, 1856, p. 403.
Hab. Woodlark Island.

8. BETANGA MEGÆRA.

Euplœa megæra, Butler, Proc. Zool. Soc. 1866, p. 276; Journ. Linn. Soc., Zool. xiv. p. 300.
Hab. Aru.

PENOA, n. g.

Euplœa (sect. C & D), Marshall and de Nicéville, Butt. of India, p. 80 (1882).

Male. Differs from typical *Crastia* (*core*) in having a less triangular form of fore wing, which is also broader and is glossed with purple-violet or deep blue, the exterior and posterior margins convex, the edge of the latter more even, and in possessing a very long and broad sericeous brand: hind wing shorter, the costal margin straighter.

Type *P. alcathoe*.

1. PENOA ALCATHOE.

Danais alcathoe, Godart, Enc. Méth. ix. p. 178 (1819).
Euplœa alcathoe, Butler, Journ. Linn. Soc., Zool. xiv. p. 301;

Marshall and de Nicéville, Butt. of India, p. 86, pl. 9. f. 17, ♂ ♀ (1882).

Euplœa doubledayi, Felder, Reise Novara, Lep. ii. p. 337 (1867).

Hab. Silhet (*Brit. Mus.*), Assam (*Atkinson*), Cachar, Mergui, Upper Tenasserim.

2. **Penoa deione.** (Plate XXX. fig. 2, ♂.)

Euplœa deione, Westwood, Cabinet of Oriental Ent. p. 76, pl. 37. f. 3, ♂ (1848); Butler, Journ. Linn. Soc., Zool. xiv. p. 301; Marshall & de Nicéville, Butt. of India, p. 88.

Euplœa poeyi, Felder, Reise Novara, Lep. ii. p. 340, ♀ (1867).

Euplœa magnifica, Butler, Trans. Ent. Soc. 1874, p. 423, ♀.

Hab. Assam (*Westwood*), Silhet (*Brit. Mus.*), Sikkim (*Atkinson*).

3. **Penoa menetriesii.**

Euplœa ménétriésii, Felder, Wien. entom. Monats. iv. p. 398 (1860); Butler, Journ. Linn. Soc., Zool. xiv. p. 301; Distant, Rhop. Malayana, p. 34, pl. 3. f. 4, 5, ♂ ♀; Marshall & de Nicéville, Butt. of India, p. 87.

Hab. Malay peninsula (Province Wellesley, Malacca); ? Borneo (*Lowe*). Coll. Godman and Salvin.

4. **Penoa pinwillii.**

Euplœa pinwillii, Butler, Trans. Linn. Soc. 2nd ser. i. p. 535, pl. 69. f. 9 (1876–9); Journ. Linn. Soc., Zool. xiv. p. 301; Distant, Rhop. Malayana, p. 35, pl. 3. f. 9, 10.

Hab. Malay peninsula (Province Wellesley, Malacca); Sumatra.

5. **Penoa limborgii.** (Plate XXX. fig. 7, ♂.)

Euplœa limborgii, Moore, Proc. Zool. Soc. 1878, p. 823, pl. 41. f. 2; Marshall & de Nicéville, Butt. of India p. 89 (1882).

Euplœa gerningii, Boisd. MS., ♂.

Hab. British Burmah (Tenasserim, Mergui).

6. **Penoa eyndhovii.**

Euplœa eyndhovii, Felder, Reise Novara, Lep. ii. p. 338 (1867); Butler, Journ. Linn. Soc., Zool. xiv. p. 301.

Hab. Java.

7. **Penoa geyeri.**

Euplœa geyeri, Felder, Reise Novara, Lep. ii. p. 338 (1867).

Hab. Java.

8. **Penoa transpectus**, n. sp.

Male. Upperside—fore wing dark brown as in *P. alcathoe*, but somewhat paler, the submarginal and discal spots of the underside being slightly visible; a broad lengthened straight sericeous streak between lower median and submedian veins: hind wing paler brown, with two or three apical submarginal indistinct whitish spots and anal marginal series of six or seven spots. Underside paler brown: fore wing with six small submarginal and six marginal smaller white spots, two purple-white subcostal spots, one at lower end of the cell and two beyond it, beneath which is an elongated ochreous-white spot: hind wing with a purple-white spot at the end of the cell, and five contiguous spots beyond; a marginal and submarginal row of small white spots.

Female. Upperside paler; markings of the underside slightly visible. Underside—fore wing similarly marked as male, the marginal spots being less prominent: hind wing with seven spots outside the cell, the submarginal series all elongated as in *P. pinwillii*, and the marginal row more prominent.

Expanse 4 inches.

Hab. Billiton Island. In coll. Messrs. Godman and Salvin.

9. PENOA ZONATA.

Euplœa zonata, Druce, Proc. Zool. Soc. 1873, p. 338, ♂.

Hab. N. Borneo (*Lowe*). In coll. Godman and Salvin.

Genus CRASTIA, Hübner.

Crastia, Hübner, Verz. bek. Schmett. p. 16 (1816).

Euplœa, Boisduval, Doubleday, Butler; Moore, Lep. of Ceylon, i. p. 11 (1880).

Euplœa (sect. A), Marshall & de Nicéville, Butt. of India, p. 79 (1882).

Fore wing elongated, triangular; costa slightly arched, apex rounded; exterior margin oblique, slightly waved and concave in the middle; posterior margin almost straight in both sexes; male with a short slender sericeous brand or scent-producing organ between the lower median and submedian veins; costal vein extending to nearly two thirds the margin; first subcostal branch emitted at one fifth before end of the cell, second from the extreme end, third about one third beyond, fourth and fifth at one third before the apex; upper discocellular shortest, inwardly oblique, angled outward close to the subcostal and emitting a short spur from its lower end within the cell; lower discocellular outwardly oblique and angled outward close to its upper end, the radials from their upper angles; median branches from angles wide apart; submedian slightly recurved, with a short slender lower veinlet at its base. Hind wing short, bluntly oval; costa slightly arched in the middle; costal vein short, curved near the base; precostal short, forked; first subcostal branch emitted from angle before end of the cell; discocellulars outwardly oblique, upper shortest and very concave, lower slightly convex, the radial from their middle; median branches from angles widely apart; submedian straight; internal curved at its base. Body long, slender; antennæ slender; legs squamose; tibiæ and tarsi spinous beneath; palpi short, pilose.

Larva with three anterior pairs and one posterior pair of fleshy filaments.

Type *C. core*, Cramer.

Note. Cramer's *P. core* has hitherto been considered the same species as that described by Fabricius (Ent. Syst. iii. p. 41) under the name of *corus* and cited under that name in his genus *Euplœa* (Illiger's Mag. vi. p. 280).

These two names, however, refer to totally distinct insects, each belonging to a different section of this subfamily of butterflies[1].

From the fact of these two names having been thus considered, by modern authors, *to represent the same species*, several errors have resulted in determining the types in certain of the genera.

These errors are now, it is hoped, satisfactorily worked out in the present memoir, and the several species assigned to their proper genera.

1. CRASTIA VERMICULATA.

Euplœa vermiculata, Butler, Proc. Zool. Soc. 1866, p. 276; Journ. Linn. Soc., Zool. xiv. p. 301 (1878).

Euplœa vermiculata, Marshall & de Nicéville, Butt. of India, p. 81 (1882).

Limnas M. cora, Hübner, Samml. exot. Schmett. Bd. i. pl. 25. f. 1, 2 (1806).

Hab. India (Himalaya Mountains).

2. CRASTIA CORE. (Plate XXIX. fig. 8, ♂.)

Papilio core, Cramer, Pap. Exot. iii. pl. 266. f. E, F (1780), nec *corus*, Fabricius.

Crastia core, Hübner, Verz. bek. Schmett. p. 16 (1816).

Euplœa core, Butler, Journ. Linn. Soc., Zool. xiv. p. 301 (1878); Marshall & de Nicéville, Butt. of India, p. 80 (1882), pl. 9. f. 16, ♂ ♀.

Danais coreta, Godart, Enc. Méth. ix. p. 178 (1819).

Hab. India, Lower (Kutch, Bombay, Nilgiris, Calcutta; Andamans).

3. CRASTIA ASELA.

Euplœa asela, Moore, Ann. Nat. Hist. ser. 4, xx. p. 45 (1877); Lep. of Ceylon, i. p. 11, pl. 6. f. 2 (1880); Marshall & de Nicéville, Butt. of India, p. 81 (1882).

Hab. Ceylon.

4. CRASTIA GRAMINIFERA, n. sp.

Differs from *C. vermiculata* in the upperside being of a uniform pale olive-brown: fore wing with the marginal row of spots more recurved across the wing and sharply defined, the third and fourth upper spots of a larger oval shape, the lower somewhat smaller; a minute spot on the costa above end of the cell, and another spot beyond situated between the upper and middle median branches: hind wing with the two rows of spots smaller and more sharply defined.

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[1] For *E. corus*, Fabricius, see p. 289.

Expanse, ♂ 3⅛ inches.

Hab. Malay peninsula. In coll. Mons. C. Oberthür.

5. CRASTIA DISTANTI. (Plate XXIX. fig. 6, ♂.)

Crastia distantii, Moore, Annals & Mag. Nat. Hist. ser. 5, ix. p. 453 (1882); Distant, Rhopalocera Malayana, p. 32, pl. 5. f. 9, ♂.

Upperside dark cupreous-brown, glossed with olive-green: fore wing with a series of eight or nine white submarginal spots, and a marginal row of small spots, similarly disposed and of the same shape as those in the Malayan *Tronga bremeri*, but somewhat larger; two small spots also on the disk below the upper and middle median veins in some specimens; a short slender sericeous streak between lower median and submedian: hind wing with two rows of prominent white spots. Underside greenish olive-brown: fore wing with marginal markings as above; two small spots also on the costa, another spot at end of the cell, and three on the disk: hind wing with prominent marginal spots; a spot at end of the cell, and five spots beyond.

Expanse 2⅝ to 3⅕ inches.

Hab. Sumatra (type); Malay peninsula (Province Wellesley) In coll. F. Moore and W. L. Distant.

6. CRASTIA ESPERI.

Euplœa esperi, Felder, Verh. zool.-bot. Gesell. xii. p. 481, ♀ (1862); Moore, P. Z. S. 1877, p. 582; W.-Mason, Journ. Asiat. Soc. Beng. 1881, p. 227; Marshall & de Nicéville, Butt. of India, p. 83 (1882).

Hab. Nicobars.

7. CRASTIA GODARTI.

Euplœa godartii, Lucas, Rev. Zool. 1853, p. 319, ♀; Butler, P. Z. S. 1866, p. 275; id. Journ. Linn. Soc., Zool. xiv. p. 301; Moore, P. Z. S. 1878, p. 824; Distant, Rhop. Malayana, p. 34, pl. 3. f. 8.

Euplœa siamensis, Felder, Reise Novara, Lep. ii. p. 341, pl. 41. f. 6 (1867).

Euplœa godartii, Marshall & de Nicéville, Butt. of India, p. 84 (1882).

Hab. British Burmah; Upper Tenasserim; Malacca; Siam; Java (*Lucas*), Philippine Islands (Brit. Mus. coll.).

8. CRASTIA BINGHAMI, n. sp.

Allied to *C. godarti*. Similar in colour, but with the pitchy-brown tint darker and confined more obliquely to the basal area, the apical area without any trace of purplish grey.

Male. Fore wing with similar marginal spots and a shorter sericeous streak; hind wing with similar spots as in *C. godarti*.

Female. Fore wing with a curved submarginal row of seven spots, the upper third distinct, and the fourth indistinct; the marginal row as in male: hind wing as in male.

Expanse, ♂ $3\frac{3}{8}$, ♀ $3\frac{6}{8}$ inches.

Hab. Thoungyeen, Upper Tenasserim (*Capt. Bingham*). In coll. British Museum and W. L. Distant.

9. CRASTIA LAYARDI.

Euplœa layardi, Druce, Proc. Zool. Soc. 1874, p. 103, pl. 16. f. 1, ♀.

Hab. Siam; Saigon.

10. CRASTIA INCONSPICUA, n. sp.

Male. Upperside similar in colour to *C. layardi*: fore wing shorter anteriorly; no marginal or apical spots; a very slender short sericeous streak between the lower median and submedian veins: hind wing with two marginal rows of whitish spots decreasing to smaller brownish spots toward the apex. Underside—fore wing with a bluish-white spot at lower end of the cell, another beyond the cell, a minute streak below the lower radial, and another on the costa, also a larger oval spot below the cell: hind wing with a small white spot at end of the cell, five contiguous spots beyond it, and two marginal rows of spots, the inner series oval.

Expanse $3\frac{1}{4}$ inches.

Hab. Sumatra (*Wallace*). In coll. Messrs. Godman and Salvin.

11. CRASTIA CAMORTA. (Plate XXXI. fig. 7, ♂.)

Euplœa camorta, Moore, Proc. Zool. Soc. Lond. 1877, p. 582; Wood-Mason, Journ. Asiatic Soc. Bengal, 1881, p. 228, 1882, p. 15; Marshall & de Nicéville, Butt. of India, p. 86 (1882).

Hab. Nicobar Islands.

12. CRASTIA FRAUENFELDI.

Euplœa frauenfeldii, Felder, Verh. zool.-bot. Gesell. xii. p. 479 (1862); Reise Novara, Lep. ii. p. 342, pl. 41. f. 4 (1867); Butler, Journ. Linn. Soc., Zool. xiv. p. 300, ♂ (1878).

Euplœa frauenfeldi, Moore, Lep. of Ceylon, i. p. 12 (1880); Marshall & de Nicéville, Butt. of India, p. 79 (1882).

Hab. Ceylon.

13. CRASTIA AMYMONE.

Danais amymone, Godart, Enc. Méth. ix. p. 179 (1819).

Euplœa amymone, Butler, Journ. Linn. Soc., Zool. xiv. p. 300.

Hab. China; Cochin China; Sumatra (B.M.).

14. CRASTIA LORQUINI.

Euplœa lorquinii, Felder, Reise Novara, Lep. ii. p. 340 (1867).

Hab. S. China; Macao. In coll. F. Moore and H. G. Smith.

15. CRASTIA FELDERI.

Euplœa felderi, Butler, Proc. Zool. Soc. 1866, p. 275, ♀; Journ. Linn. Soc., Zool. xiv. p. 300.

Hab. Sumatra (type, B.M.); Hong Kong (B.M.).

16. CRASTIA PRUNOSA, n. sp.

Allied to *C. amymone*. Upperside of a more purplish violet-brown, the borders paler, the basal area in certain lights bluish-violet, the sericeous streak shorter, the two marginal rows of spots almost obliterated and of a violet-brown: hind wing with very indistinct marginal rows of pale brown spots. Underside—fore wing with only very small inner apical marginal spots, and two spots above posterior angle: hind-wing with no marginal spots.

Expanse 3¼ inches.

Hab. China. In coll. C. Oberthür.

17. CRASTIA HAWORTHI.

Euplœa haworthii, Lucas, Rev. Zool. 1853, p. 317, ♂.

Euplœa hübneri, Moore, Catal. Lep. Mus. E.I. C. i. p. 128 (1857); Butler, Journ. Linn. Soc., Zool. xiv. p. 300.

Euplœa janus, Butler, Proc. Zool. Soc. 1866, p. 273; Journ. Linn. Soc., Zool. xiv. p. 300.

Euplœa moorei, Felder, Reise Novara, Lep. ii. p. 315 (1867), nec Boisd.

Salpinx elusina, Hübner, Samml. exot. Schmett. Bd. ii. pl. 9. f. 1, 2 (nec Cramer).

Hab. Java.

18. CRASTIA SNELLENI, n. sp.

Male and Female. Umber-brown: fore wing with a submarginal series of whitish spots, the upper five very minute, the upper first, second, fourth, and fifth being almost obsolete, the sixth and seventh small; a marginal lower row of very small indistinct spots; sericeous streak greyish-brown. Hind wing with a marginal row of small brownish-white oval spots, and a submarginal row of eight narrow lengthened streaks and three upper rounded spots.

Expanse 4 inches.

Hab. Philippines (Mindanao). In coll. G. Semper and F. Moore.

19. CRASTIA ILLUDENS.

Euplœa illudens, Butler, Ann. Nat. Hist. ser. 5, x. p. 40, ♂ ♀ (1882).

Hab. Duke-of-York Island; New Britain.

20. CRASTIA DECIPIENS.

Euplœa decipiens, Butler, Ann. Nat. Hist. ser. 5, x. p. 41, ♂ ♀ (1882).

Hab. Duke-of-York Island.

MAHINTHA, n. g.

Male with short broad wings: the fore wing somewhat the shape of that of *Salpinx*, but less quadrate; costal margin arched; exterior margin nearly erect, waved, slightly angular below the apex and above posterior angle; hind margin long, convex; with a short slender sericeous brand. Hind wing obovate; exterior margin waved; no pale discoidal patch.

MAHINTHA SUBDITA.

Euplœa subdita, Moore, Proc. Zool. Soc. Lond. 1878, p. 823; Marshall & de Nicéville, Butt. of India, p. 82 (1882).

Hab. Tenasserim. In coll. British Museum.

KARADIRA, n. g.

Euplœa, sect. B (part.), Marshall & de Nicéville, Butt. of India, p. 80 (1882).

Male. Distinguished from typical *Crastia* (*core*) in the fore wing having the posterior margin very considerably produced into a broad convex lobe, a comparatively broader and shorter cell, the submedian vein slightly recurved and terminating below the posterior angle; and with a medium-sized sericeous brand. Hind wing much more round in form.

KARADIRA ANDAMANENSIS.

Euplœa andamanensis, Atkinson, Proc. Zool. Soc. 1873, p. 736, pl. 63. f. 2, ♂; Butler, Journ. Linn. Soc., Zool. xiv. p. 300; Moore, P. Z. S. 1877, p. 582; Marshall & de Nicéville, Butt. of India, p. 84 (1882).

Hab. Andaman Isles.

PRAMASA, n. g.

Male with the costal margin of fore wing regularly arched; exterior margin oblique, convex below the apex and slightly angular hindward; posterior margin very convex in middle; with a very large broad sericeous brand. Hind wing almost round, exterior margin slightly uneven.

PRAMASA MITRA. (Plate XXXI. fig. 8, ♂.)

Euplœa mitra, Moore, Catal. Lep. Mus. E.I. C. i. p. 127, ♂ (1857); Butler, P. Z. S. 1866, p. 299; Journ. Linn. Soc., Zool. xiv. p. 300.

Hab. Seychelle Islands.

The female of this extraordinarily marked species has the markings similar to the male. Both sexes are in the collection of Messrs. Godman and Salvin.

TAGATA, n. g.

Fore wing with the costal margin nearly straight, apex convex, exterior margin oblique, posterior margin in male regularly convex to the end, and with a lengthened broad sericeous brand. Hind wing short, broad; exterior margin oblique, abdominal margin long.

TAGATA ABJECTA.

Euplœa abjecta, Butler, Proc. Zool. Soc. 1866, p. 299; Journ. Linn. Soc., Zool. xiv. p. 300.

Hab. Pelew Islands.

The habitat of this insect is not the Philippines as stated in the description. Mr. G. Semper, of Altona, from whom the type specimens described by Mr. Butler were originally obtained, informs me that these specimens were collected in the Pelew Islands.

PRAMESTA, n. g.

Fore wing triangular, arched at the base, apex slightly rounded, exterior margin oblique, waved, posterior margin slightly convex; sericeous brand long, slender. Hind wing broad, exterior margin waved.

PRAMESTA TOBLERI.

Euplœa tobleri, Semper, Verh. nat. Unt. Hamburg, iii. p. 107 (1878).

Both sexes black: fore wing with a broad white macular oblique subapical band, a small spot above end of the cell, threee on middle of exterior margin, and in the female two between the middle and lower medians. Hind wing with a broad white streak between the veins below the cell from abdominal margin, decreasing in length to middle of the disk; the streaks between the medians cleft at their end; a row of six small white spots on middle of exterior margin.

Expanse 3¼ to 3½ inches.

Hab. Philippines (Luzon). In coll. G. Semper.

RASUMA, n. g.

Fore wings short, very broad in both sexes, triangular; exterior margin slightly oblique, convex; posterior margin in male very convex externally, and with a lengthened broad sericeous brand. Hind wing broad and short.

Type *R. violetta.*

1. RASUMA VIOLETTA.

Calliplœa violetta, Butler, Ann. Nat. Hist. ser. 4, xviii. p. 242 (1876).

Euplœa violetta, Butler, Journ. Linn. Soc., Zool. xiv. p. 300.

Hab. New Guinea (Port Moresby).

2. RASUMA ORDINATA, n. sp.

Allied to *R. violetta.* Fore wing in male with a submarginal row of nine small distinct purplish-white spots, and eight spots in the female: hind wing without spots.

Expanse 2¾ inches.

Hab. New Guinea (Port Moresby). In coll. British Museum.

3. RASUMA GUERINI.

Euplœa guerinii, Felder, Reise Novara, Lep. ii. p. 332 (1867); Butler, Journ. Linn. Soc., Zool. xiv. p. 300.

Hab. Aru; New Guinea (Port Moresby).

4. RASUMA DENTICULATA, n. sp.

Near to *R. ordinata*. Fore wing comparatively longer, the sericeous brand narrower, the submarginal spots, eight in the male and nine in the female, are less distinct, narrower, and the three lower spots dentate.

Expanse 3 inches.

Hab. New Guinea (Port Moresby). In coll. British Museum.

5. RASUMA BIPUNCTATA, n. sp.

Allied to *R. guerini.* Fore wing with the subapical spots less distinct, the fourth and fifth spots oval and only half the size. Hind wing with two smaller upper submarginal spots.

Expanse, ♂ ♀ 2¾ inches.

Hab. New Guinea (Port Moresby). In coll. British Museum.

6. RASUMA DOLOSA.

Euplœa dolosa, Butler, Proc. Zool. Soc. 1876, p. 765, pl. 77. fig. 1, ♂; Journ. Linn. Soc., Zool. xiv. p. 300.

Hab. New Guinea (Port Moresby).

Note. The female of *R. dolosa* has the subapical spots of the same size as those in the male.

The insect described by Mr. Butler as the female of *R. dolosa* belongs to *R. pleiadis.*

7. RASUMA PLEIADIS, n. sp.

Euplœa dolosa, Butler, Proc. Zool. Soc. 1876, p. 765, ♀.

Differs from *R. siderea* in being smaller. Fore wing with a slender sericeous brand of half its width, fourth and fifth subapical spots longer and narrower, the male also having three smaller spots beneath the fifth.

Expanse, ♂ ♀ 2½ inches.

Hab. New Guinea (Port Moresby). In coll. British Museum.

8. RASUMA LOUISA, n. sp.

Near *R. pleiadis.* Fore wing with the larger submarginal spots of a blunt oval shape, the three lower spots more distinct, the upper one being larger and the middle one not entire in the male; these three spots in the female are also larger, the middle one entire and the largest.

Expanse 2½ inches.

Hab. New Guinea (Port Moresby). In coll. British Museum.

9. RASUMA SIDEREA, n. sp.

Near to *R. astræa.* Fore wing with a much broader sericeous brand, the subapical spots very prominent and with clearly defined edges, the fourth and fifth spots shorter and more regularly cordate in shape, the two lower spots distinct.

Expanse, ♂ $2\frac{8}{12}$ inches.

Hab. New Guinea (Port Moresby). In coll. British Museum.

10. RASUMA ASTRÆA, n. sp.

Near to *R. dolosa*, Butler. Fore wing comparatively shorter and broader, with similarly disposed subapical spots, all of which are more distinctly defined and somewhat larger, those of the female being much larger than in the female *R. dolosa*; the sericeous brand of the male is one third less in width.

Expanse, ♂ ♀ $2\frac{3}{4}$ inches.

Hab. New Guinea (Port Moresby). In coll. British Museum.

11. RASUMA STELLA, n. sp.

Allied to *R. dolosa*. Comparatively smaller; the subapical spots on fore wing similarly disposed, but more distinct, slightly larger, and more oval in shape in both sexes.

Expanse $2\frac{1}{2}$ inches.

Hab. New Guinea (Port Moresby). In coll. British Museum.

CHIROSA, n. g.

Fore wing elongated, narrow. Male with the exterior margin very oblique, posterior margin slightly convex; with a broad sericeous brand, which is situated nearer the outer border. Hind wing narrow, triangular, the apex somewhat extended.

Type *C. brenchleyi.*

1. CHIROSA BRENCHLEYI.

Euplœa brenchleyi, Butler, Ann. Nat. Hist. ser. 4, v. p. 357 (1870); Journ. Linn. Soc., Zool. xiv. p. 301; Brenchley's 'Cruise of the Curaçoa,' p. 464, pl. 46. f. 1–4 (1873) ♂ ♀.

Hab. Solomon Islands.

2. CHIROSA EURYPON.

Euplœa eurypon, Hewitson, Exotic Butt. ii. *Eupl.* pl. i. fig. 3 (1858), ♂; Butler, P. Z. S. 1866, p. 286; Journ. Linn. Soc., Zool. xiv. p. 301.

Hab. Ké Island (B.M.); Ceram (*Godman*).

3. CHIROSA VICINA.

Euplœa vicina, Felder, Reise Novara, Lep. ii. p. 337 (1867).

Hab. Aru.

4. CHIROSA MOROSA.

Euplœa morosa, Butler, Proc. Zool. Soc. 1866, p. 282, fig. 2; Journ. Linn. Soc., Zool. xiv. p. 301.

Euplœa dalmannii, Felder, Reise Novara, Lep. ii. p. 332 (1867).

Hab. Gilolo; Halmaheira.

5. CHIROSA PIERRETII.

Euplœa pierretii, Felder, Reise Novara, Lep. ii. p. 331 (1867); Butler, Journ. Linn. Soc., Zool. xiv. p. 301.

Euplœa melina, Oberthür, Ann. Mus. di Storia Nat. Genova, 1877, p. 456.

Hab. Waigiou, Port Moresby, New Guinea.

6. CHIROSA LAPEYROUSEI.

Euplœa lapeyrousei, Boisduval, Voy. Astrolabe, Lép. p. 97, ♂ (1832).

Hab. Bouru (*Boisd.*). In coll. C. Oberthür.

The type specimen of this species is much like *C. pierreti*, excepting that the sericeous streak is narrower and longer. On the underside the discal spots are slightly larger.

MESTAPRA, n. g.

Differs from typical *Chirosa* in the fore wing being broader, the exterior margin less oblique and more convex, the posterior margin also more convex, the sericeous brand very large and broad, being nearly four times the size of that in *Chirosa*: hind wing broader and more convex externally.

Type *M. fraudulenta*.

1. MESTAPRA EURIANASSA.

Euplœa eurianassa, Hewitson, Exot. Butt. ii. p. 12, *Eupl.* pl. 1. fig. 3, ♂ (1858).

Hab. New Guinea.

2. MESTAPRA TORVINA.

Euplœa torvina, Butler, Proc. Zool. Soc. 1875, p. 611; id. Journ. Linn. Soc., Zool. xiv. p. 301.

Hab. New Hebrides (Aneiteum, Lifu).

3. MESTAPRA PAYKULLEI.

Euplœa paykullei, Butler, Ann. Nat. Hist. ser. 4, xviii. p. 241 (1876); Journ. Linn. Soc., Zool. xiv. p. 301.

Hab. New Hebrides (Vate, Aneiteum, Mota).

4. MESTAPRA FRAUDULENTA.

Euplœa fraudulenta, Butler, Ann. Nat. Hist. ser. 5, x. p. 41, ♂ (1882).

Hab. Solomon Islands.

C. *No sexual mark on fore wing. Hind wing with a glandular patch.*

Genus TREPSICHROIS.

Trepsichrois, Hübner, Verz. bek. Schmett. p. 16 (1816); Butler, Journ. Linn. Soc. Zool. xiv. p. 296 (1878).

Euplœa (Trepsichrois), Marshall & de Nicéville, Butt. of India, p. 74 (1882).

Eudæmon, Dalmann, Billb. Enum. Ins. p. 76 (1820).

Male. Fore wing elongated triangular; apex prolonged and slightly rounded, exterior margin very oblique, uneven, somewhat concave in the middle; posterior margin very slightly convex; upper discocellular inwardly oblique, acutely bent before lower radial, emitting a short spur within the cell from the angle: hind wing with a very small pale discoidal glandular patch.

Larva of *T. claudia* with four pairs of long fleshy filaments.

Type *T. claudia*.

1. TREPSICHROIS LINNÆI. (Plates XXIX. fig. 4, ♀, & XXX. fig. 1, ♂.)

Papilio midamus (part.), Linn. Mus. Lud. Ulr. p. 251 (1764); Fabricius, Syst. Ent. p. 479; Spec. Ins. ii. p. 52; Ent. Syst. iii. i. p. 39.

Danais midama (part.), Godart, Enc. Méth. ix. p. 172 (1819).

Euplœa midamus, Doubleday & Hewits. D. Lep. p. 87; Moore, Cat. Lep. Mus. E.I. C. i. p. 183; Butler, Catal. Fabrician Lep. B. M. p. 2; P. Z. S. 1866, p. 294; Kirby, Catal. D. Lep. p. 15; Aurivillius, Kongl. Vetens. Akad. Handlingar, 1882, p. 61.

Trepsichrois midamus, Butler, Journ. Linn. Soc., Zool. xiv. p. 297 (1878); Distant, Rhop. Malayana, p. 24, pl. 2. f. 8, 9, ♂ ♀.

Euplœa (Trepsichrois) midamus, Marshall & de Nicéville, Butt. of India, p. 74, pl. 8. fig. 13, ♂ ♀ (1882).

Ehret, Plantæ et Papil. pl. 3 (1748), *male*.

Kleeman, Beitr. Nat. Insecten, i. p. 69, pl. 9. f. 1, 2 (1792), *female*.

Hab. N.W. & E. Himalayas, Khasia, British Burmah, Malay peninsula, Penang, Sumatra, Siam, Formosa.

From the above references it will be seen that the *P. midamus* of Linnæus has hitherto been identified with this species. This erroneous determination has been caused by Linnæus himself referring, in his original description of *P. midamus* (Syst. Nat. 1758, p. 470), to Ehret's figure on plate iii. as well as to that on his plate xi., and in the Mus. Ulricæ, p. 251, therein supplementing his description of *P. midamus* with that of the present insect.

For true *P. midamus*, Linn., see below, p. 312.

2. TREPSICHROIS CLAUDIA.

Papilio claudius, Fabricius, Gen. Ins. p. 263 (1777); Mant. Ins. p. 25 (1787); Ent. Syst. iii. i. p. 40 (1793), ♀; Herbst, Natur. Schmett. vi. p. 17, pl. 120. f. 5.

Danais claudia, Godart, Enc. Méth. ix. p. 180.

Trepsichrois claudia, Butler, Journ. Linn. Soc., Zool. xiv. p. 296 (1878).

Euplœa midamus, var. *claudius*, Butler, Catal. Fabr. Lep. B. M. p. 2.

Papilio basilissa, Cramer, Pap. Exot. iii. pl. 266. f. C ♀ (1780).

Trepsichrois basilissa, Hübner, Verz. bek. Schmett. p. 16.

Euplœa mulciber, Zink.-Somm. Nova Acta Acad. Cur. 1831, p. 191 (nec Cramer).

Papilio midamus, Sulzer, Insecten, pl. 16. f. 4, ♂ ♀.

Euplœa midamus, Horsf. Catal. Lep. Mus. E.I.C. pl. 3. f. 10 (1828); Moore, Catal. Lep. Mus. E.I.C. i. p. 83, pl. 4. fig. 10, 10*a* (metam.); Lucas, Lép. Exot. pl. 45. fig. 2, ♂.

Hab. Java.

3. TREPSICHROIS VERHUELLI, n. sp.

Female. Darker-coloured than either *T. linnæi* or *T. claudia*: fore wing blacker towards the apex, and with less blue reflections; the spots more prominent and sharply defined; lower cell-spot and the discal series of spots of the same size as those in Malacca and Sumatran females of *T. linnæi*, the marginal series very similar to those in Java female of *T. claudia*, except that the fourth upper spot is much larger and a quarter of an inch long, the lower spots are also more oval in shape, the marginal spots more distinct and ascending to the apex, the pale cell-streak and the streak below the cell more indistinct: hind wing with the streaks between the veins all conspicuously narrower than in either of the above mentioned species, and the marginal spots also smaller.

Expanse 3¼ inches.

Hab. Nias Island, west coast of Sumatra. In coll. British Museum.

4. TREPSICHROIS MULCIBER.

Papilio mulciber, Cramer, Pap. Exot. ii. pl. 127. figs. C, D (1777).

Trepsichrois mulcibra, Hübner, Verz. bek. Schmett. p. 16 (1816).

Trepsichrois mulciber, Butler, Journ. Linn. Soc., Zool. xiv. p. 296 (1878).

Euplœa mulciber, Distant, Rhopalocera Malayana, p. 25, pl. 3. f. 1, 2, ♂ ♀ (1882).

Hab. Borneo (Labuan, Sarawak); Billiton; ? Malay peninsula.

5. TREPSICHROIS DIOCLETIA.

Trepsichrois diocletia, Hübner, Samml. exot. Schmett. Bd. iii. pl. f. 3, 4, ♀ (1806–24).

Crastia diocletia, Butler, Journ. Linn. Soc., Zool. xiv. p. 297.

Euplœa megilla, Erichson, Nova Acta Acad. Nat. Cur. xvi. p. 282, pl. 50. fig. 7 (1834), ♀.

Hab. Philippines (Luzon).

6. TREPSICHROIS TISIPHONE.

Euplœa tisiphone, Butler, Proc. Zool. Soc. 1866, p. 274, ♂.
Trepsichrois tisiphone, Butler, Journ. Linn. Soc., Zool. xiv. p. 297.
Euplœa semperi, Felder, Reise Novara, Lep. ii. p. 314 (1867).
Hab. Philippines (Mindoro).

7. TREPSICHROIS KOCHI, n. sp.

Trepsichrois kochii, Semper, MS.

Male. Fore wing violet-black, brilliantly glossed with ultramarine blue, a large greyish-blue spot at lower end of the cell, six discal spots, seven submarginal spots, and a marginal row of small spots; hind wing similar to that of *T. claudia.*

Expanse 3¼ inches.

Hab. Philippines (Negros and Guimaras). In coll. G. Semper and F. Moore.

8. TREPSICHROIS VISAYA.

Euplœa visaya, Semper, MS.

Hab. Philippines (Samar, Leyte, Bohol). In coll. Messrs. Godman and Salvin.

9. TREPSICHROIS MINDANAOENSIS.

Euplœa mindanaoensis, Semper, MS.

Hab. Philippines (Mindanao). In coll. G. Oberthür.

GLINAMA, n. g.

Male. Fore wing long, costa straight at the base and slightly arched towards the end, apex acutely convex; exterior margin long, very oblique and slightly convex; posterior margin short and convex. Hind wing short, broad, costa nearly straight, apex slightly acute; exterior margin very convex and waved, abdominal margin short; costal border greyish white; with a discoidal ochreous glandular patch.

GLINAMA EUCTEMON.

Euplœa euctemon, Hewitson, Exotic Butt. iii. *Eupl.* pl. 2. f. 2, ♂ (1866).

Hab. Menado. Hewitson coll., British Museum.

Genus EUPLŒA.

Euplœa, Fabricius, Illiger's Mag. vi. p. 280 (1807)

Macroplœa, Butler, Journ. Linn. Soc., Zool. xiv. p. 292 (1878); Moore, Lep. of Ceylon, i. p. 9 (1880).

Euplœa (*Macroplœa*), Marshall and de Nicéville, Butt. of India, p. 71 (1882).

Wings very large and broad. Male with the fore wing elongated and quadrate; apex acuminate; exterior margin oblique; posterior margin convex at the angle, very convex in the middle, and extremely oblique thence to the base; cell very broad; discocellulars concave, discoidal spur obsolete: hind wing triangular; the costal margin long, apex somewhat angular, exterior margin regularly convex; with a large oval pale upper discoidal glandular patch.

Type *E. corus*, Fabr.

Note.—Hübner (Verz. p. 16), Doubleday (Genera D. Lep. p. 88), Scudder (Hist. Sketch of Generic Names of Butterflies, p. 172), Kirby (Syn. Catal. p. 10), and Butler (Linn. Journ., Zool. xiv. p. 291) have each taken the *P. core* of Cramer to be the same species as the *P. corus* of Fabricius, both Mr. Scudder and Mr. Butler citing *core* as the typical representative of the Fabrician genus *Euplœa*. Mr. Butler, however, though having previously (Catal. Fabrician Lep. in British-Museum Collection, p. 1, 1869) noted that the *P. corus* of Fabricius had no connexion with the *P. core* of Cramer, and referred the former species to a local form of the female of *Euplœa phœnareta*, subsequently overlooked this important fact in his revision of the group published in the 'Linnean Journal,' wherein the *P. core* of Cramer is cited as typically representing the genus *Euplœa*. This erroneous identification I myself followed in the recently published part of the 'Lepidoptera of Ceylon,' i. p. 11. Having since gone more fully into the study of the entire group of these interesting Butterflies, the distinction of the two above-cited species (*corus* and *core*) became apparent to me, the comparison of the descriptions resulting in the determination that the Fabrician species *corus* is identical with the female of *Macroplœa elisa*, a totally different insect and pertaining to a different section of the group, from that of the *core* of Cramer.

1. EUPLŒA PHŒBUS.

Euplœa phœbus, Butler, Proc. Zool. Soc. 1866, p. 270.

Macroplœa phœbus, Butler, Journ. Linn. Soc., Zool. xiv. p. 292 (1878).

Euplœa castelnaui, Felder, Reise Novara, Lep. ii. p. 315, ♀ (1867); Distant, Rhopalocera Malayana, p. 24, pl. 2. f. 6, ♀.

Euplœa (*Macroplœa*) *castelnaui*, Marshall and de Nicéville, Butt. of India, p. 72 (1882).

Hab. Assam (Cherrapunji), British Burmah, Malay peninsula, Penang, Kar Nicobar, Sumatra, Java.

2. EUPLŒA CORUS.

Papilio corus, Fabricius, Ent. Syst. iii. p. 41 (1793), ♀.

Euplœa corus, Fabr. Illiger's Mag. vi. p. 280 (1807).

Danais cora, Godart, Enc. Méth. ix. p. 178.

Euplœa elisa, Butler, Proc. Zool. Soc. 1866, p. 270.

Macroplœa elisa, Butler, Journ. Linn. Soc., Zool. xiv. p. 293; Moore, Lep. of Ceylon, i. p. 9, pl. 5. f. 2.

Euplœa (*Macroplœa*) *elisa*, Marshall and de Nicéville, Butt. of India, p. 72, pl. 8. f. 14, ♂ (1882).

Hab. Ceylon.

3. EUPLŒA GYLLENHALI.

Euplœa gyllenhalii, Lucas, Rev. Zool. 1853, p. 316, ♂.

Hab. Java. In coll. Paris Museum.

The type specimen of *E. gyllenhalii* is very closely allied to both *E. corus* and to *E. phœbus*; but it differs in having comparatively narrower wings, the markings above approaching more to those of *E. phœbus*.

Owing to M. Lucas omitting to describe the discal patch on the hind wing in his description of this species, it has subsequently been considered identical with the *E. ochsenheimeri*, Moore.

4. EUPLŒA DRUCEI, n. sp.

Male. Comparatively larger than *E. phœbus* and of a brighter purplish-brown tint; fore wing longer and broader, with the marginal spots more slender, the submarginal also smaller, the discal series much more slender and indistinct, the cell-spot also indistinct; hind wing with all the spots smaller.

Female. Darker, and with all the markings less distinct than in the same sex of *E. phœbus*.

Expanse, ♂ 4⅝, ♀ 5¼ inches.

Hab. Siam (Chentaboon, *Layard*). In Banksian Collection, British Museum, and Messrs. Godman and Salvin's collection.

5. EUPLŒA GRANDIS, n. sp.

Male. Allied to *E. drucei*: fore wing comparatively longer and narrower, with the discal series of spots narrow, elongated, and distinct, the submarginal row composed of very small dentate spots, the marginal spots minute and almost obsolete; hind wing with three upper series of spots, the discal series largest.

Expanse, ♂ 5¼ inches.

Hab. ——? In coll. G. Semper.

6. EUPLŒA BUTLERI, n. sp.

Male and Female. Smaller than *E. phœbus*. Male darker purplish violet-brown, with violet-blue reflections in some lights; the discal and submarginal row of spots of a purplish-violet tint, much smaller and more distinctly formed than in *E. phœbus*; the discal and marginal spots also much smaller; the cell-spot very small and indistinct: hind wing more triangular in form, with the discoidal patch duller-coloured, the spots much smaller.

Female. Darker than in *E. phœbus*, and all the spots on both wings smaller.

Expanse, ♂ 4, ♀ 4¼ inches.

Hab. Borneo (*Lowe*). In coll. Messrs. Godman and Salvin.

A male specimen of this species labelled "Malacca" is in the collection of G. Semper of Altona. This latter locality, however, is probably incorrect.

7. EUPLŒA GODMANI, n. sp.

Male. Differs from *E. butleri* in being larger and paler in colour: fore wing with the marginal and submarginal row of spots very much more prominent and almost white in tint, the marginal series being somewhat larger and the submarginal much smaller, the latter series without any ill-defined inner portion; the discal series is also smaller and less distinct than in *E. butleri*: hind wing with all the spots comparatively larger and more prominent.

Female darker than same sex of *E. butleri*, markings more prominent than in male.

Expanse, ♂ 4¼, ♀ 4¾ inches.

Hab. Sandakan, N. Borneo (*Pryer*). In colls. Messrs. Godman and Salvin and H. G. Smith.

8. EUPLŒA PHÆNARETA.

Papilio phœnareta, Schaller, Naturforscher, xxi. p. 177, pl. 5. f. 1, 2 (1785), ♂.

Euplœa phœnareta, Kirby, Trans. Ent. Soc. Lond. 1869, p. 358.

Macroplœa phœnareta, Butler, Journ. Linn. Soc., Zool. xiv. p. 292.

Papilio midamus, Cramer, Pap. Exot. iii. pl. 266. f. A, B, ♀, nec Linn. (1782).

Papilio affinis, Gmelin, Syst. Nat. iv. p. 2289 (1788–91); Zschach, Mus. Lesk. Ent. p. 89. no. 46.

Trepsichrois alea, Hübner, Verz. bek. Schmett. p. 16 (1816).

Danais prothoe, Godart, Enc. Méth. ix. p 177 (1819)

? *Euplœa pavettœ*, Zinken-Sommer, Nova Acta Acad. Nat. Cur. xv. p. 189 (1831).

Seba, Thesaurus, iv. pl. 29. f. 13.

Hab. Amboina, Ceram.

9. EUPLŒA SEMICIRCULUS.

Euplœa semicirculus, Butler, Proc. Zool. Soc. 1866, p. 269, f. ♂.

Macroplœa semicirculus, Butler, Journ. Linn. Soc., Zool. xiv. p. 292.

Euplœa cuvieri, Felder, Reise Novara, Lep. ii. p. 315, pl. 39. f. 1, 2, ♂ (1867).

Female. Somewhat smaller than the same sex of *E. phœnareta*. Both wings with an intense purplish-blue tint in some lights: fore wing with a recurved submarginal row of purplish-white spots, smaller than those in *E. phœnareta*, the four upper being minute; two blue streaks on the costa above end of the cell; and a discal curved row of five purplish-white spots, the three upper being slender; a small speckled spot also within lower end of the cell: hind wing with a submarginal and marginal upper series of whitish spots.

Expanse, ♀ 5 inches.

Hab. Gilolo, Amboina, Bouru (*Wallace*). In coll. British Museum and that of H. G. Smith.

10. EUPLŒA UNIBRUNNEA.

Euplœa unibrunnea, Salvin and Godman, Proc. Zool. Soc. 1877, p. 141, ♂; P. Z. S. 1882, p. 754, ♀.

Hab. Duke-of-York Island; New Ireland.

11. EUPLŒA BROWNI.

Euplœa brownii, Salvin and Godman, Proc. Zool. Soc. 1877, p. 142, pl. 22. f. 1, 2.

Hab. Duke-of-York Island.

Genus CALLIPLŒA.

Calliplœa, Butler, Trans. Ent. Soc. 1875, p. 1.

Euplœa (Calliplœa), Marshall and de Nicéville, Butt. of India, p. 73 (1882).

Wings small, short, broad. Male with the fore wing somewhat quadrate; hind margin convex in the middle and thence very oblique to the base; cell broad; upper discocellular bent near each end, lower outwardly oblique; inner spur obsolete: hind wing with a pale oval discoidal glandular patch.

Type *C. darchia.*

1. CALLIPLŒA LEDERERI.

Euplœa ledereri, Felder, Wien. ent. Monats. iv. p. 397 (1860); Reise Novara, Lep. ii. p. 317, pl. 40. f. 5, 6 (1867); Distant, Rhopalocera Malayana, p. 26, pl. 2. f. 10.

Calliplœa ledereri, Butler, Journ. Linn. Soc., Zool. xiv. p. 295.

Euplœa inquinata, Butler, Proc. Zool. Soc. 1866, p. 291 & f. 2 (p. 288).

Euplœa (Calliplœa) ledereri, Marshall and de Nicéville, Butt. of India, p. 73 (1882).

Hab. Malay peninsula (Province Wellesley, Perak, Malacca); Sumatra.

2. CALLIPLŒA MAZARES.

Euplœa mazares, Moore, Catal. Lep. Mus. E.I. C. i. p. 128 (1857).

Calliplœa mazares, Butler, Journ. Linn. Soc., Zool. xiv. p. 295.

Hab. Java.

3. CALLIPLŒA ARISTOTELIS, n. sp.

Euplœa aristotelis, Boisd. MS.

Allied to *C. mazares*. Male duller-coloured, with similarly disposed but smaller markings on fore wing. Female duller brown in tint, with paler margins, and not suffused with violet-blue; fore wing with a curved submarginal series of six minute white spots, all being of equal size; hind wing with small indistinct upper submarginal spots.

Expanse 2½ to 2¾ inches.

Hab. Sandakan, N. Borneo (*Pryer*). In coll. W. L. Distant and C. Oberthür.

4. Callіplœa mariesis, n. sp.

Allied to *C. mazares*. Male uniformly much darker-coloured in both wings; fore wing with the marginal spots twice the size, and all with inner blue border; hind wing with smaller but more prominent bluish-white submarginal spots, these spots extending to anal angle.

Expanse, ♂ 2¼ inches.

Hab. Lu Shan Mountains, Kinkiang, N. China. In coll. British Museum.

5. Calliplœa pollita.

Euplœa pollita, Erichson, Nova Acta Acad. Nat. Cur. xvi. p. 282, pl. 50. f. 6 (1834).

Calliplœa pollita, Butler, Journ. Linn. Soc., Zool. xiv. p. 296.

Hab. Philippines.

6. Calliplœa monilis, n. sp.

Allied to *C. mazares*. Wings comparatively broader and shorter, the colour similar but darker; fore wing with the submarginal row of spots very much larger in both sexes, and all with broad greyish-blue inner border; hind wing with very prominent whitish upper submarginal spots.

Expanse, ♂ 2½, ♀ 2¾ inches.

Hab. Philippines (Mindanao). In coll. G. Semper and F. Moore.

7. Calliplœa engrammelli, n. sp.

Euplœa engrammellii, Boisd. MS.

Female. Near to *C. darchia*. Upperside reddish-purple brown; fore wing with a submarginal upper row of very small bluish-white spots, smaller in size than those of *C. striata*; hind wing with very faintly defined upper submarginal spots. Cilia of both wings entirely brown.

Expanse 2⅝ inches.

Hab. Gilolo (*Wallace*). In coll. H. G. Smith.

8. Calliplœa kirschi, n. sp.

Female. Near to *C. pumila*. Differs from same sex in being larger; colour similar, but darker basally: fore wing with a submarginal medial series of five small greyish-white spots, the inner area bordering the spots being grey speckled; hind wing with three upper submarginal whitish spots.

Expanse 3⅛ inches.

Hab. Waigiou (*Wallace*). In coll. H. G. Smith.

9. Calliplœa stephensi.

Euplœa stephensii, Felder, Reise Novara, Lep. ii. p. 320 (1867).

Hab. Mysol.

10. CALLIPLŒA HYEMS.

Euplœa hyems, Butler, Proc. Zool. Soc. 1866, p. 292, f. 3, p. 288.
Calliplœa hyems, Butler, Journ. Linn. Soc., Zool. xiv. p. 296.
Euplœa arisbe, Felder, Reise Novara, Lep. ii. p. 323 (1867).
Euplœa leda, Boisd. MS.

Hab. Timor.

11. CALLIPLŒA INFANTILIS.

Calliplœa infantilis, Butler, Proc. Zool. Soc. 1876, p. 766, pl. 77. fig. 3; Journ. Linn. Soc., Zool. xiv. p. 296.

Hab. New Guinea.

12. CALLIPLŒA JAMESI.

Calliplœa jamesi, Butler, Proc. Zool. Soc. 1866, p. 766, pl. 77. fig. 2; Journ. Linn. Soc., Zool. xiv. p. 296.

Hab. New Guinea (Port Moresby).

13. CALLIPLŒA PUMILA.

Euplœa pumila, Butler, Proc. Zool. Soc. 1866, p. 290; Kirsch, Mitth. zool. Mus. Dresden, 1877, p. 117.
Calliplœa pumila, Butler, Journ. Linn. Soc., Zool. xiv. p. 295.
Euplœa trimenii, Felder, Reise Novara, Lep. ii. p. 324 (1867).

Hab. New Guinea; Waigiou.

14. CALLIPLŒA SALABANDA.

Euplœa salabanda, Kirsch, Mitth. zool. Mus. Dresden, i. p. 116, pl. 6. f. 9 (1877), ♂.

Hab. New Guinea.

15. CALLIPLŒA SISAMIS.

Euplœa sisamis, Kirsch, Mitth. zool. Mus. Dresden, i. p. 117, pl. 6. f. 8, ♂ (1877).

Hab. New Guinea (Jobi).

16. CALLIPLŒA DORYCA.

Calliplœa doryca, Butler, Journ. Linn. Soc., Zool. xiv. p. 295 (1878), ♀.

Hab. Dorey.

17. CALLIPLŒA SAUNDERSI.

Euplœa tulliolus, var. *saundersii*, Butler, P. Z. S. 1866, p. 291.
Euplœa saundersii, Felder, Reise Novara, Lep. ii. p. 322 (1867).
Calliplœa saundersii, Butler, Journ. Linn. Soc., Zool. xiv. p. 296 (1878).

Hab. Aru Island.

18. Calliplœa hopfferi.

Euplœa hopfferi, Felder, Reise Novara, Lep. ii. p. 323, pl. 41. fig. 1 (1867).

Hab. Aru Island.

19. Calliplœa niveata.

Calliplœa niveata, Butler, Trans. Ent. Soc. 1875, p. 2; Journ. Linn. Soc., Zool. xiv. p. 296.

Euplœa goezi, Boisd. MS.

Hab. Australia (Queensland, Cape York, Fitzroy Island).

20. Calliplœa tulliolus.

Papilio tulliolus, Fabricius, Ent. Syst. iii. 1, p. 41 (1793); Donovan, Nat. Rep. ii. pl. 55. f. 1.

Danais tulliola, Godart, Enc. Méth. ix. p. 181; Macleay, King's Austral. ii. p. 461.

Euplœa tulliolus, Butler, Catal. Lep. Fabr. B. M. p. 2; Semper, Mus. Godeffroy, xiv. Lep. p. 142.

Calliplœa tulliolus, Butler, Journ. Linn. Soc., Zool. xiv. p. 296.

Hab. N. Australia (Rockingham Bay, Port Stephen); Frankland Isles; Aneiteum; Erromango.

21. Calliplœa darchia.

Danais darchia, Macleay, King's Austr. ii. p. 462 (1827).

Euplœa darchia, Doubleday & Hewits. Gen. D. Lep. p. 87.

Calliplœa darchia, Butler, Trans. Ent. Soc. 1875, p. 39; Journ. Linn. Soc., Zool. xiv. p. 296.

Hab. Australia.

22. Calliplœa priapus.

Euplœa priapus, Butler, Proc. Zool. Soc. 1866, p. 291, pl. 29. fig. 2.

Calliplœa priapus, Butler, Journ. Linn. Soc., Zool. xiv. p. 296.

Hab. Australia (Port Essington, New Holland).

23. Calliplœa turneri.

Calliplœa turneri, Butler, Journ. Linn. Soc., Zool. xiv. p. 296 (1878), ♀.

Hab. Darnley Island.

24. Calliplœa seriata.

Euplœa seriata, Herr.-Schäffer, Stettin. ent. Zeit. 1869, p. 69.

Calliplœa seriata, Butler, Journ. Linn. Soc., Zool. xiv. p. 295.

Hab. Vanua Valava; Moala Island; Maré, Loyalty Islands.

25. Calliplœa adyte.

Euplœa adyte, Boisduval, Bull. Ent. Soc. France (1859), p. 156, ♂.

Hab. New Caledonia (*Boisd.*); Loyalty Islands (B.M.).

26. CALLIPLŒA FORSTERI.

Euplœa forsteri, Felder, Reise Novara, Lep. ii. p. 322 (1867).

Hab. Fiji Islands.

D. *One "sexual mark" on fore wing. Hind wing with a glandular patch.*

DANISEPA, n. g.

Euplœa (Salpinx, sect. C, part.), Marshall & de Nicéville, Butt. of India, p. 59 (1882).

Male with a narrow lengthened triangular fore wing, the apex convex, posterior margin lengthened and but slightly convex, with a short broad blue sericeous brand; first subcostal branch free from subcostal; cell lengthened; discocellulars recurved; submedian recurved and running near the margin; sericeous streak short, broad, blue. Hind wing lengthened, anterior margin almost straight; a discoidal glandular patch of moderate size.

Type *D. rhadamanthus.*

1. DANISEPA RHADAMANTHUS.

Papilio rhadamanthus, Fabricius, Ent. Syst. iii. p. 42, ♂ (1793); Jones, Icones, pl. 45. fig. 2.

Salpinx rhadamanthus, Butler, Journ. Linn. Soc., Zool. xiv. p. 294.

Euplœa (*Salpinx*) *rhadamanthus*, Marshall & de Nicéville, Butt. of India, p. 69, pl. 7. f. 11, ♂ ♀ (1882).

Danais rhadamia, Godart, Enc. Méth. ix. p. 180.

Hab. India (Sikkim, Nepal, Khasia).

2. DANISEPA DIOCLETIANUS.

Papilio diocletianus, Fabricius, Ent. Syst. iii. p. 40, ♀ (1793).

Salpinx diocletianus, Butler, Journ. Linn. Soc., Zool. xiv. p. 294.

Danais diocletia, Godart, Enc. Méth. ix. p. 181 (1819).

Euplœa diocletianus, Butler, Catal. Fabr. Lep. B. M. p. 2; Distant, Rhopalocera Malayana, p. 28, pl. 4. f. 4, 5, ♂ ♀.

Euplœa (*Salpinx*) *diocletianus*, Marshall & de Nicéville, Butt. of India, p. 71 (1882).

Hab. Upper Tenasserim; Malay peninsula; Penang; Singapore; Cochin China; Sumatra.

3. DANISEPA ALCIDICE.

Danais alcidice, Godart, Enc. Méth. ix. p. 180 (1819).

Salpinx alcidice, Butler, Journ. Linn. Soc., Zool. xiv. p. 291.

Trepsichrois thoosa, Hübner, Samml. exot. Schmett. ii. pl. 8, ♂ (1820–21).

Hab. Java.

4. DANISEPA LOWEI.

Salpinx lowei, Butler, Journ. Linn. Soc., Zool. xiv. p. 294 (1878).
Hab. Borneo; ? Billiton.

TABADA, n. g.

Wings moderately short, broad. Fore wing in male triangular, costal margin convex, apex rather acute; exterior margin oblique, even; posterior margin slightly convex, angle acute; with a scarcely distinguishable short scaly brand; first subcostal anastomosed to costal; discocellulars concave; cell shorter than in *Danisepa rhadamanthus*; the median veins nearer together and straighter, submedian also straight and further above the margin. Hind wing subconical, with a small pale ochreous discoidal glandular patch.

TABADA HYACINTHA.

Euplœa hyacinthus, Butler, P. Z. S. 1866, p. 296, pl. 29. fig. 5.
Salpinx hyacinthus, Butler, Journ. Linn. Soc., Zool. xiv. p. 294 (1878).
Euplœa hewitsoni, Felder, Reise Novara, Lep. ii. p. 326, pl. 40. fig. 7 (1867), nec Butler.
Hab. Celebes.

SATANGA, n. g.

Wings in male large and broad. Fore wing triangular, costa arched in the middle, apex acuminate; exterior margin very oblique and even; hind margin short, very slightly convex in middle; with a very indistinct small sericeous brand; first branch of subcostal free; discocellulars slightly recurved. Hind wing subconical, exterior margin slightly uneven; with a distinct whitish oval discoidal glandular patch.

SATANGA EUPATOR.

Euplœa eupator, Hewitson, Exot. Butt. ii. *Eupl.* pl. 1. fig. 1, ♂ (1858), iii. pl. 2. fig. 1, ♀ (1866).
Salpinx eupator, Butler, Journ. Linn. Soc., Zool. xiv. p. 294 (1878).
Hab. Celebes.

SAPHARA, n. g.

Male. Fore wing elongated, narrow, quadrate; costa almost straight, apex convex; exterior margin very oblique, short and even; hind margin very deeply convex near the base, the outer portion being parallel with the costa; with a small scaly sericeous brand; upper discocellular acutely bent above lower radial, emitting a rather long spur within the cell from the angle. Hind wing very convex externally, outer margin even; with a large dull ochreous discoidal glandular patch.

Female. Fore wing triangular; hind wing less convex externally.
Type *S. treitschkei.*

1. SAPHARA TREITSCHKEI.

Euplœa treitschkei, Boisduval, Voy. Astrol., Lép. p. 98 (1832); Doubleday and Hewits. D. Lep. pl. 11. f. 2, ♂; Butler, P. Z. S. 1866, p. 292; Kirsch, Mitth. zool. Mus. Dresden, 1877, p. 117.

Salpinx treitschkei, Butler, Journ. Linn. Soc., Zool. xiv. p. 294 (1878).

Hab. New Ireland.

2. SAPHARA BIFORMIS.

Salpinx biformis, Butler, Ann. Nat. Hist. ser. 5, x. p. 37, ♂ ♀ (1882).

Hab. Duke-of-York Island.

3. SAPHARA ÆNEA.

Salpinx ænea, Butler, Ann. Nat. Hist. ser. 5, x. p. 38, ♂ ♀ (1882).

Hab. Solomon Islands.

4. SAPHARA VIRIDIS.

Salpinx viridis, Butler, Ann. Nat. Hist. ser. 5, x. p. 38, ♀ (1882).

Hab. Thursday Island (S. of New Guinea).

5. SAPHARA LORENZO.

Euplœa lorenzo, Butler, Ann. Nat. Hist. ser. 4, v. p. 359 (1870); Brenchley's Cruise of 'Curaçoa,' p. 466, pl. 47. f. 3, 4 (1873).

Salpinx lorenzo, Butler, Journ. Linn. Soc., Zool. xiv. p. 294 (1878).

Hab. Solomon Islands.

6. SAPHARA JESSICA.

Euplœa jessica, Butler, Lep. Exotica, p. 20, pl. 8. f. 3, ♂ (1870).

Hab. Fiji Islands.

7. SAPHARA ERIMAS.

Euplœa erimas, Godman & Salvin, Proc. Zool. Soc. 1878, p. 733, ♂; id. 1879, p. 156, pl. 15. f. 1, ♂.

Hab. New Ireland.

SELINDA, n. g.

Fore wing narrower than in typical *Salpinx*; costa more arched and comparatively longer, apex acute, exterior margin very oblique; hind margin convex in middle; with a very broad short silky-white brand; cell narrower, shorter hindward, the lower end slightly shorter than upper; discocellulars concave, no inner spur. Hind wing subconical, narrower; exterior margin less convex; discoidal glandular patch dull-coloured.

Type *S. mniszechi*.

1. SELINDA MNISZECHI.

Euplœa mniszechii, Felder, Wien. ent. Monats. iii. p. 181, pl. 3. f. 3, ♂ (1859).

Salpinx mniszechii, Butler, Journ. Linn. Soc., Zool. xiv. p. 293 (1878).

Hab. Celebes.

2. SELINDA VOLLENHOVII.

Euplœa vollenhovii, Felder, Reise Novara, Lep. ii. p. 327 (1867); Hopffer, Stettin. ent. Zeit. 1874, p. 28.

Hab. Celebes (Girontalo); Sula (*Wallace*).

3. SELINDA ELEUSINA.

Papilio eleusina, Cramer, Pap. Exot. iii. pl. 266. f. D (1780).

Salpinx eleusina, Hübner, Samml. exot. Schmett. Bd. ii. pl. 9. f. 3, 4, ♀ (1806).

Danais eleusine, Godart, Enc. Méth. ix. p. 177.

Euplœa mazares (part.), Doubleday & Hewits. Gen. D. Lep. p. 87.

Hab. Java.

HIRDAPA, n. g.

Male with short, very broad fore wing; costa much arched, apex acute; exterior margin long, slightly oblique and convex; hind margin deeply convex towards the angle; cell very broad, upper discocellular slightly concave, lower outwardly oblique; lower median and submedian very wide apart, submedian very recurved; with a very short broad sericeous brand. Hind wing very broadly oval, exterior margin oblique; cell broad; with a large pale ochreous glandular patch.

Type *H. usipetes*.

1. HIRDAPA USIPETES.

Euplœa usipetes, Hewitson, Exot. Butt. ii. *Eupl.* pl. 1. f. 4, ♂ (1858).

Salpinx usipetes, Butler, Journ. Linn. Soc., Zool. xiv. p. 294 (1878).

Hab. Aru Islands.

2. HIRDAPA ASSIMILATA.

Euplœa assimilata, Felder, Reise Novara, Lep. ii. p. 321, pl. 41. f. 2, 3, ♂ (1867).

Salpinx assimilata, Butler, Journ. Linn. Soc., Zool. xiv. p. 293 (1878).

Hab. Aru Islands; Tijoor.

3. HIRDAPA FRATERNA.

Euplœa fraterna, Felder, Reise Novara, Lep. ii. p. 322, ♂ (1867).

Salpinx fraterna, Butler, Journ. Linn. Soc., Zool. xiv. p. 293 (1878).

Hab. Ké Island.

4. HIRDAPA FRIGIDA.

Salpinx frigida, Butler, Journ. Linn. Soc., Zool. xiv. p. 293, ♂ (1878).

Hab. N. Ceram.

5. HIRDAPA IMITATA.

Euplœa imitata, Butler, Ann. Nat. Hist. ser. 4, v. p. 359 (1870); Brenchley's Cruise of 'Curaçoa,' p. 466, pl. 47. f. 1, 2, ♂ (1873).

Salpinx imitata, Butler, Journ. Linn. Soc., Zool. xiv. p. 293 (1878).

Hab. Solomon Islands.

Genus SALPINX.

Salpinx, Hübner, Verz. bek. Schmett. p. 17 (1816); Butler, Journ. Linn. Soc., Zool. xiv. p. 292.

Euplœa (*Salpinx*, sect. C, part.), Marshall & de Nicéville, Butt. of India, p. 59 (1882).

Wings short. Fore wing in male very broad, somewhat quadrate, apex acuminate; exterior margin slightly oblique and convex; posterior margin acuminate at the angle, very convex in the middle; cell broad, short; with a short broad blue or silky brand. Hind wing broad, anterior margin convexly angular in middle; cell very long; with a large pale-coloured upper discoidal glandular patch of compact scales. Female with longer triangular wings.

Type *S. nemertes*.

1. SALPINX NOVARÆ.

Euplœa novaræ, Felder, Verh. zool.-bot. Gesell. ii. p. 482 (1862); Reise Novara, Lep. ii. p. 317, pl. 39. f. 7, ♂.

Euplœa (*Salpinx*) *novaræ*, Marshall & de Nicéville, Butt. of India, p. 68 (1882).

Hab. Nicobar Isles; Tenasserim. In coll. F. Moore.

2. SALPINX VESTIGIATA.

Euplœa vestigiata, Butler, Proc. Zool. Soc. 1866, p. 281, ♂ only.

Salpinx vestigiata, Butler, Journ. Linn. Soc., Zool. xiv. p. 293 (1878).

Euplœa vestigiata, Distant, Rhop. Malayana, p. 26, pl. 3. f. 6, 7, ♂ ♀ (1882).

Hab. Sumatra (type ♂[1]). In colls. British Museum and F. Moore.

3. SALPINX LAZULINA, n. sp.

Calliplœa vestigiata, Butler, Trans. Linn. Soc., Zool. 2nd ser. i. p. 533 (1879).

Euplœa vestigiata (part.), Distant, Rhop. Malayana, p. 27.

Differs from typical *S. vestigiata*. *Male*. Fore wing of a darker velvety blue-black with a brilliant blue gloss in some lights, the submarginal blue spots larger; on the upper discal area are two short slender blue streaks, the costal spot is smaller, the elongated blue sericeous streak below median vein longer and broader, with a contiguous slender similar short streak below it: hind wing similar, but with slightly more distinct marginal spots.

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[1] On reference to the original register at the British Museum, it has been found that the locality of this species there given is Sumatra, not Java as stated in Mr. Butler's description.

Female. Fore wing with similar but smaller submarginal paler blue spots; costal spot and less distinct upper discal streaks and two slightly smaller streaks below the median vein: hind wing with more distinct upper submarginal and lower marginal spots.

Expanse, ♂ 3⅜, ♀ 3⅝ inches.

Hab. Malacca. In coll. British Museum.

4. Salpinx leucogonys.

Salpinx leucogonys, Butler, Trans. Linn. Soc. 2nd ser. i. p. 536, pl. 68. f. 5, ♀ (1879).

Euplœa (*Salpinx*) *leucogonys*, Marshall & de Nicéville, Butt. of India, p. 69 (1882).

Euplœa vestigata (variety), Distant, Rhop. Malayana, p. 27.

Hab. Malacca. In coll. British Museum.

Male. Fore wing with four very small upper submarginal blue spots, a costal spot, and a short streak below the median vein: hind wing whitish-speckled from anal angle.

5. Salpinx leucostictos.

Papilio leucostictos, Gmelin, Syst. Nat. v. Ins. ii. p. 2289 (1789); Zschach, Mus. Lesk. Ent. p. 90, No. 48.

Euplœa leucostictos, Kirby, Trans. Ent. Soc. Lond. 1869, p. 358.

Danais eunice, Godart, Enc. Méth. ix. p. 177 (1819).

Salpinx eunice, Butler, Journ. Linn. Soc., Zool. xiv. p. 293.

Euplœa vestigiata (part), Butler, P. Z. S. 1866, p. 288, f. 1, ♀.

Hab. Java. In coll. British Museum.

6. Salpinx hobsoni.

Salpinx hobsoni, Butler, Proc. Zool. Soc. 1877, p. 811, ♂.

Hab. N. Formosa. In coll. British Museum.

7. Salpinx dehaani.

Euplœa dehaanii, Lucas, Rev. Zool. 1853, p. 313, ♂.

Euplœa westwoodii, Boisduval, MS., ♂

Allied to *S. eunice* and *S. hobsoni*. *Male.* Fore wing with a submarginal row of bluish spots, a small spot on the costa above end of the cell, a larger spot within lower end of the cell, one beyond it, an elongated spot below the lower median vein, and a very small spot above the latter between the lower and middle median veins: hind wing with a prominent discoidal ochreous patch, pale costal border, and three small whitish submarginal spots.

Expanse 2⅝ inches.

Hab. Java.

This species, from the type specimen of which the above description is taken, is very like *Calliplœa mazares* and *C. ledereri*; but the latter differs in the markings of the fore wing all being smaller, and in the absence of the lower elongated spot: the hind wing of the two latter species also has no discoidal patch.

8. SALPINX OCULATA, n. sp.

Male. Allied to *S. nemertes*; smaller in size; colour deeper brown and of a uniform tint. Fore wing with a small bluish-white costal spot above end of the cell, an upper submarginal curved row of six small spots, of which the upper third spot is slightly the largest; a small speckled spot between middle and lower median veins, and a large spot between median and submedian, the latter spot with a grey centre. Hind wing with a well-defined ochreous discoidal patch, and three very small upper submarginal bluish-white spots.

Expanse $2\frac{7}{8}$ inches.

Hab. Philippines (Mindanao). In coll. British Museum.

9. SALPINX BOURUANA, n. sp.

Female. Upperside very dark purplish violet-brown: fore wing with seven submarginal distinct bluish-white spots, the three upper largest and oval, the lower very small and decreasing in size; a small blue spot on costa above end of the cell, and a distinct blue spot between median and submedian veins: hind wing with a submarginal upper curved series of five decreasing bluish-white spots, the two lowest very small; a small spot at lower end of the cell. Underside brighter purplish violet-brown: fore wing with a complete marginal row of small bluish-white spots placed in proximate pairs between the veins; the submarginal row and the costal and lower discal spot larger and more prominent than on upperside; four small short narrow spots on the disk beyond the cell: hind wing with a complete marginal row of very small bluish-white spots, and a submarginal curved row of ten larger spots; a small blue spot between the lower subcostal and radial.

Expanse $3\frac{3}{4}$ inches.

Hab. Bouru. In coll. Messrs. Godman and Salvin.

Distinguished from Amboina female of *S. pasithea* by its very much darker colour on the upper- and underside, the more prominent white submarginal spots, and the distinct blue costal spot and lower discal spot of the upperside.

10. SALPINX NEMERTES.

Limnas mutabilis nemertes, Hübner, Samml. exot. Schmett. f. 3, 4, ♂ (1806).

Salpinx nemertes, Hübner, Verz. bek. Schmett. p. 17 (1806).

Euplœa aglidice, Boisduval, Voy. Astrolabe, Lép. p. 96, ♀ (1835).

Euplœa eunice, Butler, P. Z. S. 1866, p. 286, f. 2, ♀.

Hab. Amboina; Ceram. In coll. British Museum.

11. SALPINX STAINTONI.

Euplœa staintoni, Felder, Novara Reise, Lep. ii. p. 319 (1867), ♂ ♀.

Hab. Waigiou.

12. SALPINX PASITHEA.

Euplœa pasithea, Felder, Reise Novara, Lep. ii. p. 318 (1867).
Salpinx pasithea, Butler, Journ. Linn. Soc., Zool. xiv. p. 292 (1878).

Hab. Amboina.

13. SALPINX HERBSTI.

Euplœa herbstii, Boisduval, Voy. Astrolabe, Lép. p. 95, ♂ (1835).

Hab. New Guinea.

14. SALPINX HISME.

Euplœa hisme, Boisduval, Voy. Astr., Lép. p. 95 (1832); Montr. Ann. Sc. Phys. Nat. Lyon, 1856, p. 403; Butler, P. Z. S. 1866, p. 286, f. 1; Kirsch, Mitth. zool. Mus. Dresden, 1877, p. 116.
Salpinx hisme, Butler, Journ. Linn. Soc., Zool. xiv. p. 292 (1878).
Euplœa bernsteini, Felder, Reise Novara, Lep. ii. p. 319 (1867).

Hab. Aru Islands.

15. SALPINX CONSANGUINEA.

Salpinx consanguinea, Butler, Journ. Linn. Soc., Zool. xiv. p. 293 (1878).

Hab. New Hebrides (Aneiteum).

16. SALPINX GRAEFFIANA.

Euplœa graeffiana, Herr.-Schäff. Stett. ent. Zeit. 1869, p. 70, pl. 2. f. 5; id. Exot. Schmett. f. 111 (1869).
Calliplœa græffiana, Butler, P. Z. S. 1876, p. 251.
Salpinx graeffiana, Butler, Journ. Linn. Soc., Zool. xiv. p. 293 (1878).

Hab. New Hebrides (Vaté).

17. SALPINX IPHIANASSA.

Euplœa iphianassa, Butler, P. Z. S. 1866, p. 287, f. 3.
Salpinx iphianassa, Butler, Journ. Linn. Soc., Zool. xiv. p. 293 (1878).

Hab. New Hebrides (Aneiteum).

18. SALPINX PERDITA.

Salpinx perdita, Butler, Ann. Nat. Hist. ser. 5, x. p. 39, ♂ ♀ (1882).

Hab. Duke-of-York Island; New Britain.

19. SALPINX MACLEAYI.

Euplœa macleayi, Felder, Reise Novara, Lep. ii. p. 320 (1867).

Hab. Fiji Islands.

20. SALPINX KADU.

Euplœa kadu, Eschscholtz, Kotzebue's Reise, iii. p. 210, pl. 6. f. 15, *a*, *b*, ♂ (1821).

Danaida eunice, Quoy & Gaimard, Freyc. Voy. p. 555, pl. 83. f. 1, ♂; Guérin, Icon. Règn. Anim., Ins. p. 474, pl. 77. f. 4, ♂.

Hab. Mariana Isles (*Esch.*); Borneo (coll. Brit. Mus.).

21. SALPINX HEWITSONI.

Euplœa hewitsonii, Butler, P. Z. S. 1866, p. 295, pl. 30. f. 2, ♀.

Salpinx hewitsonii, Butler, Journ. Linn. Soc., Zool. xiv. p. 293.

Euplœa eunice, Boisduval, Spec. Gén. des Lép. i. pl. 24. f. 1, ♂ (1836); Lucas, Lép. Exot. p. ♂ , pl. 45. f. 1, ♂ (nec Godart).

Euplœa rœselii, Boisd. MS., ♂.

Hab. Philippines (isle of Guam).

22. SALPINX DEPUISETI.

Euplœa depuiseti, Oberthür, Trans. Ent. Soc. Lond. 1879, p. 230, pl. 8 f. 2, ♀.

Hab. Sangir Island. In coll. C. Oberthür and Messrs. Godman and Salvin.

23. SALPINX VIOLA.

Euplœa viola, Butler, P. Z. S. 1866, p. 295, pl. 30. f. 3, ♂.

Salpinx viola, Butler, Journ. Linn. Soc., Zool. xiv. p. 293.

Euplœa westwoodii, Felder, Reise Novara, Lep. ii. p. 316, pl. 40. f. 1, 2, ♂ ♀ (1867).

Hab. Celebes, Macassar.

23 A. SALPINX WEBERI, n. sp.

Allied to *S. viola*. Somewhat larger in size. Fore wing much less blue-glossed, both the inner and outer series of spots of a uniform blue, the inner series being smaller and consisting only of those above the median vein; and a narrow paler blue silky brand between the lower median and submedian; the outer row are all of a small size, and somewhat dentate in shape, the lowest spot being obsolescent. Hind wing with a submarginal row of very small round spots.

Expanse 4¼ inches.

Hab. Celebes. In coll. W. L. Distant.

23 B. SALPINX BRANDTI, n. sp.

Allied to *S. viola*; somewhat smaller in size. Fore wing less blue-glossed, with a discal curved series of six narrow oval bluish-white spots and the lower silky brand, all being much narrower and longer than in *S. viola*, the spot above the brand of the same length as the brand; outer series of blue spots similar in form, but smaller than those in *S. viola*, being composed of scattered scales, and not extending towards the inner row. Hind wing with a similar row of blue spots composed of scattered scales.

Expanse 3½ inches.

Hab. Celebes. In coll. W. L. Distant.

24. SALPINX LABREYI, n. sp.

Male. Violet-brown, much paler, and not suffused with blue as in *S. viola.* Fore wing with a pale purplish violet-brown row of submarginal spots, the four upper spots small and round, the two next somewhat oval, the lower geminated; a violet-white spot on costa above end of the cell, followed below by three upper discal large, irregular, oval spots; a violet-brown streak above submedian. Hind wing with a submarginal row of small purplish-violet decreasing spots.

Expanse 4 inches.

Hab. Unknown. In coll. Hewitson, British Museum.

25. SALPINX CALLITHOË.

Euplœa callithoë, Boisduval, Voy. Astrolabe, Lep. p. 93, ♂ (1832).

Macroplœa callithoë, Butler, Journ. Linn. Soc., Zool. xiv. p. 292.

Hab. New Guinea. In coll. M. Oberthür.

26. SALPINX EUTHOË.

Euplœa euthoë, Felder, Reise Novara, Lep. ii. p. 316 (1867).

Hab. Aru.

27. SALPINX MESOCALA.

Euplœa mesocala, Vollenhoven, Tijd. voor Ent. 2nd ser. viii. p. 244, pl. 11. f. 1 ♂, 2 ♀ (1873).

Hab. Waigiou.

28. SALPINX ALTHÆA.

Euplœa althæa, Semper, Verh. des Vereins natur. Unt. Hamburg, iii. p. 106 (1878).

Hab. Mindanao. In coll. G. Semper.

29. SALPINX MEYERI.

Euplœa meyeri, Hopffer, Stett. ent. Zeit. 1874, p. 29.

Hab. Celebes.

PADEMMA, n. g.

Euplœa (*Salpinx*, sect. B), Marshall & de Nicéville, Butt. of India, p. 59 (1882).

Intermediate in form between *Salpinx* and *Isamia*; differing from *Salpinx* in the fore wing being comparatively narrower, the apex more acute, exterior margin more oblique, and the sericeous brand shorter and broader. From typical *Isamia* the fore wing differs in its shorter and more quadrate form, and in the shortness of the sericeous brand.

Type *P. klugii.*

1. PADEMMA KLUGI. (Plate XXXII. fig. 1, ♂.)

Euplœa klugii, Moore, Catal. Lep. Mus. E.I. Co. i. p. 130, ♂ ♀ (1857).

Salpinx klugii, Butler, Journ. Linn. Soc., Zool. xiv. p. 294.
Euplœa (*Salpinx*) *klugii*, Marshall & de Nicéville, Butt. of India, p. 64 (1882).
Euplœa whitei, Boisd. MS., ♂.
Hab. N.E. Bengal. In coll. British Museum and F. Moore.

2. PADEMMA GRANTI.

Salpinx grantii, Butler, Trans. Ent. Soc. Lond. 1879, p. 2, ♀.
Euplœa (*Salpinx*) *grantii*, Marshall & de Nicéville, Butt. of India, p. 64 (1882).
Hab. Cachar (type). In coll. British Museum.

3. PADEMMA DHARMA, n. sp. (Plate XXXII. fig. 2, ♀.)

Female. Fore wing violet-brown glossed throughout with violet-blue, with a bluish-white costal spot above end of the cell, a very slight lower streak beyond the cell, and five upper submarginal spots, of which the three lowest are much elongated and clavate; a distinct spot above the lower median and a streak above the submedian. Hind wing brown, with three small upper submarginal distinct pure white spots, the others pale brown.

Expanse, ♀ $3\frac{3}{4}$ inches.

Hab. Nowgong, Assam (*Span*). In coll. F. Moore.

In pattern of markings on the fore wing this species is more like female *I. grantii*; but in *I. dharma* these are larger and more prominent, and both the submarginal and marginal row is also larger and whiter; the colour of the fore wing is also much paler, and has not the brilliant blue gloss of that species.

4. PADEMMA AUGUSTA, n. sp.

Male. Near to *P. klugii.* Fore wing darker blackish brown throughout, and of a more brilliant glossy blue, which extends to the extreme margins; with a similar bluish-white mark at end of the cell; two very slender streaks beyond, a spot between the lower medians, and an elongated bluish sericeous streak above the submedian; submarginal row of spots smaller, marginal minute and obsolete at upper end. Hind wing with a broad chestnut-brown abdominal area; marginal spots almost obsolete.

Expanse, ♂ $3\frac{1}{2}$ inches.

Hab. Nowgong, Assam (*Span*). In coll. F. Moore.

5. PADEMMA INDIGOFERA, n. sp. (Plate XXXII. fig, 3, ♂.)

Allied to *P. klugii*; differs in being one third less in size. Fore wing uniformly suffused with clear blue throughout the wing; marginal markings similar and prominent; the two streaks beyond the cell shorter, and the small costal spot distinct; sericeous streak short and broader. Hind wing also suffused with clear blue; the discal patch duller-coloured; marginal spots prominent.

Expanse $2\frac{5}{8}$ inches.

Hab. Nowgong, Assam (*Span*). In coll. F. Moore.

6. PADEMMA IMPERIALIS, n. sp.

Nearest to *P. klugii*. *Male* and *female* of the same brilliant glossy blue. Fore wing differs in both rows of marginal spots being comparatively larger, and slightly confluent in the male. Hind wing, in both sexes, with a complete marginal row of small spots, the submarginal row incomplete hindward.

Expanse, ♂ 3½, ♀ 4 inches.

Hab. N.E. Bengal. In coll. British Museum and F. Moore.

7. PADEMMA ILLUSTRIS.

Salpinx illustris, Butler, Journ. Linn. Soc., Zool. xiv. p. 294, ♂ (1878).

Euplœa (*Salpinx*) *illustris*, Marshall & de Nicéville, Butt. of India, p. 66 (1882).

Euplœa bohemanni, Boisd. MS., ♂.

Hab. Silhet (E. Bengal).

8. PADEMMA REGALIS, n. sp.

Allied to *P. illustris*. *Male and female*. Fore wing of the same intense glossy blue; both rows of marginal spots complete to posterior angle. Hind wing also with both rows of marginal spots complete.

Expanse, ♂ 3⅜, ♀ 3⅜ inches.

Hab. E. Bengal. In coll. F. Moore.

9. PADEMMA CRASSA.

Euplœa crassa, Butler, P. Z. S. 1866, p. 278.

Salpinx crassa, Butler, Journ. Linn. Soc., Zool. xiv. p. 295.

Hab. Siam (coll. Brit. Mus.); Cochin China (*Felder*).

10. PADEMMA MINORATA.

Salpinx minorata, Moore, P. Z. S. 1878, p. 695, ♂.

Hab. Island of Hainan. In coll. Messrs. Godman and Salvin.

11. PADEMMA ERICHSONI.

Euplœa erichsonii, Felder, Reise Novara, Lep. ii. p. 324 (1867).

Euplœa (*Salpinx*) *erichsonii*, Marshall & de Nicéville, Butt. of India, p. 63 (1882).

Hab. British Burmah (Moulmein). In coll. F. Moore.

Nearest to *P. crassa*. *Male* similar in colour, but darker: fore wing with both marginal rows of spots larger, the spots more elongated, the third, fourth, and fifth upper submarginals slightly confluent with their opposite marginal spots: hind wing with both rows of marginal spots smaller.

Felder gives N. India as his locality for this species (the types of which I have compared), including with it also specimens from Cochin China. These latter, however, refer to the preceding species, *P. crassa*. Felder's type specimen agrees with mine.

12. PADEMMA PEMBERTONI, n. sp. (Plate XXXII. fig. 6, ♂.)

Allied to *P. erichsonii*; similar, but paler in colour.

Male. Fore wing with both marginal rows of spots smaller and nearly obsolete posteriorly; beyond the cell are two slender short streaks of the same colour as the spots, and a spot also on the costa above end of the cell: hind wing with both marginal rows of spots obsolete towards anal angle.

Female. Fore wing with very minute outer marginal spots, larger oval submarginal spots, the two streaks beyond the cell, and two on lower part of the disk: hind wing with the two marginal rows of spots almost obsolete.

Expanse, ♂ 3⅜, ♀ 3⅞ inches.

Hab. Magaree, Pegu (coll. Moore); E. Bengal (?) (coll. Brit. Mus.).

13. PADEMMA MACCLELLANDI, n. sp. (Plate XXXII. fig. 4, ♀.)

Female. Olivaceous brown: fore wing with the basal area darker brown and suffused with violet-blue; a large violet-blue mark at end of the cell, two slender streaks beyond, a large spot between the two lower medians, and a streak above the submedian; a submarginal row of elongated whitish spots, the two upper and lowest being small, and a marginal row of small distinct white spots. Hind wing darker brown basally, with a submarginal and marginal row of small very pale brown spots, the upper submarginal spot being white.

Expanse, ♀ 3⅝ inches.

Hab. Nowgong, Assam (*Span*). In coll. F. Moore.

14. PADEMMA UNIFORMIS, n. sp.

Male. Allied to *P. crassa*. Fore wing of a more uniform darker tint and basally suffused with a violet-blue tint; marginal row of spots very minute and obsolete anteriorly, the submarginal row of spots small and of uniform size. Hind wing with the marginal row of spots minute and obsolete anteriorly, the submarginal row being obsolete posteriorly.

Expanse 3½ inches.

Hab. E. Bengal. In coll. British Museum.

15. PADEMMA APICALIS, n. sp.

Euplœa crassa, Distant, Rhopalocera Malayana, p. 29, pl. 5. fig. 8, ♂ (1882).

Near to *P. crassa*, but of a more greenish olivaceous colour, contrasting distinctly thereby with the brownish olivaceous of that species: fore wing with a complete marginal row of small spots, the submarginal row composed of five apical spots only; hind wing with both marginal rows of spots small.

Expanse 3½ inches.

Hab. British Burmah (coll. F. Moore); Quedah, Malay peninsula (coll. Distant).

16. PADEMMA BURMEISTERI, n. sp.

Euplœa burmeisteri, Boisduval, MS.

Near to *P. crassa*; smaller in size, but of the same colour.

Male with a shorter and more slender sericeous streak, the lower inner marginal row of spots of similar size to the outer row and extending to the posterior margin; hind wing with both rows of marginal spots smaller.

Female. Fore wing with the inner row of spots larger than in the male, and also extending to the posterior margin.

Expanse $2\frac{3}{8}$ inches.

Hab. Saigon, Cochin China; Upper Tenasserim. In colls. Mons. C. Oberthür, F. Moore, and British Museum.

17. PADEMMA MASONI.

Salpinx masoni, Moore, Proc. Zool. Soc. Lond. 1878, p. 823, ♂.

Euplœa (*Salpinx*) *masoni*, Marshall & de Nicéville, Butt. of India, p. 64 (1882).

Euplœa poggei, Boisd. MS.

Hab. British Burmah (Tenasserim). In colls. Brit. Mus. and F. Moore.

18. PADEMMA SINHALA.

Euplœa sinhala, Moore, Ann. Nat. Hist. ser. 4, xx. p. 45 (1877).

Isamia sinhala, Moore, Lep. of Ceylon, i. p. 10, pl. 5. fig. 1, ♂ (1880).

Hab. Ceylon.

19. PADEMMA KOLLARI. (Plate XXIX. fig. 9, ♂.)

Euplœa kollari, Felder, Reise Novara, Lep. ii. p. 325, ♂ (1867).

Isamia rothneyi, Moore, Ent. Monthly Mag. 1882, p. 34.

Euplœa (*Salpinx*) *sinhala*, Marshall & de Nicéville, Butt. of India, p. 66, pl. 7. fig. 12, ♂ ♀ (1882).

Male. Upperside dark olive-brown; basal area pitchy brown; fore wing with a submarginal row of small whitish spots and a marginal row of smaller spots, both rows decreasing in size towards the costa, and of similar size to those in *C. core* and *C. coroides*; sericeous streak short and broad. Hind wing with a pale flesh-coloured discoidal patch; a submarginal row of oval and a marginal row of smaller whitish spots; both rows also of similar size to those in the species above cited.

Expanse $3\frac{1}{2}$ inches.

Hab. Barrackpore, near Calcutta (*Rothney*); Malabar (*Semper*). In coll. F. Moore.

A single specimen of this species was recently taken at Barrackpore, near Calcutta, by Mr. G. A. J. Rothney, who mistook it for the common *C. core*. Other collectors in the same district doubtless have also been so misled by its resemblance to that common species. Since describing Mr. Rothney's specimen I have had the good fortune to receive from Dr. Rogenhofer, the Custodian of the Vienna Museum, a drawing of the type specimen of Felder's *E. kollari*, of which the habitat was unknown, and the species hitherto unidentifiable. This drawing is an exact representation of Mr. Rothney's specimen, and proves their specific identity.

The Malabar specimen in Mr. G. Semper's collection, at Altona, is half an inch less in expanse, of a reddish olive-brown colour, and with all the spots on both wings about one half less in size.

NACAMSA, n. g.

Fore wing comparatively narrower than in typical *Isamia*; more triangular in form; costa less arched and posterior margin less convex; upper discocellular with a very short spur emitted within the cell; sericeous brand narrower and shorter. Hind wing narrower; exterior margin less convex; discoidal glandular patch distinct.

Type *N. simillima*.

1. NACAMSA SIMILLIMA, n. sp.

Isamia simillima, Semper MS.

Olivaceous umber-brown. Pattern of markings like those in *Andasena swainsonii*. Fore wing with five whitish submarginal conjoined spots, a small spot beneath, followed by obsolescent pale brown lower spots; three or four upper marginal minute dots, and one at posterior angle. Hind wing with a creamy-white discoidal patch, a marginal row of small not very prominent whitish spots, and a submarginal row of indistinct pale brown elongated spots which become shorter and whiter anteriorly.

Female. Fore wing with similar but slightly larger markings as in male; hind wing with paler marginal and submarginal spots.

Expanse, ♂ 3, ♀ 3⅝ inches.

Hab. Philippines (Luzon). In coll. G. Semper and F. Moore.

2. NACAMSA MELDOLÆ, n. sp.

Brighter olivaceous umber-brown than *N. simillima*. Pattern of markings like those in *Andasena lucasii*.

Male and Female. Fore wing with a recurved submarginal series of eight spots, the three upper large and oval, the fourth, fifth and seventh round, the sixth ill-defined, the eighth duplex; a marginal row of small spots. Hind wing with a prominent creamy-white discoidal patch, a marginal row of small conical spots, and a submarginal row composed of seven very long narrow oval and three rounded upper spots, the first three from anal angle cleft at their outer end.

Expanse, ♂ 3¾, ♀ 4 inches.

Hab. Philippines (Mindanao). In coll. G. Semper and F. Moore.

Genus Isamia.

Isamia, Moore, Lep. of Ceylon, i. p. 10 (1880).
Trepsichrois (part.), Hübner.
Euplœa (*Salpinx*, section A), Marshall & de Nicéville, Butt. of India, p. 59.

Differs from typical *Salpinx* in the male having the fore wing more prolonged at the apex, the exterior margin being more oblique and waved, the hind margin more convex; no discocellular spur; with a large sericeous brand of twice the length. Hind wing with a smaller-sized discoidal glandular patch of pale compact scales.

Type *I. superba*, Herbst.

1. Isamia splendens. (Plate XXX. fig. 3, ♂.)

Euplœa splendens, Butler, P. Z. S. 1866, p. 272, ♂.
Salpinx splendens, Butler, Journ. Linn. Soc., Zool. xiv. p. 294.
Euplœa rogenhoferi, Felder, Reise Novara, Lep. ii. p. 325, ♂ (1867).
Euplœa (*Salpinx*) *rogenhoferi*, Marshall & de Nicéville, Butt. of India, p. 60 (1882).

Hab. Nepal (*Gen. Ramsay*); Sikkim (*Atkinson*); Cherra Pungi, Assam. In coll. British Museum.

2. Isamia irawada.

Euplœa irawada, Moore, Ann. Nat. Hist. ser. 4, xx. p. 45, ♂ (1877).
Euplœa (*Salpinx*) *irawada*, Marshall & de Nicéville, Butt. of India, p. 61 (1882).

Has a less brilliant blue gloss on fore wing than *I. splendens*, and which does not extend to the extreme outer margin as in that species; the discal blue spots are smaller, and do not spread towards the submarginal white spots, these latter and the marginal spots being also much smaller.

Hab. Rangoon, Burmah. In colls. F. Moore and Messrs. Godman and Salvin.

3. Isamia superba.

Papilio superba, Herbst, Natursyst. Insekten, vi. p. 14, pl. 119. fig. 3, ♀ (1793).

Male and Female. Fore wing blackish purple-brown, the basal three fourths glossed with steel-blue, a discal transverse series of five or six blue spots, the lowest elongated, a blue spot at lower end of the cell, and a bluish-white spot above it on the costa; a submarginal row of small bluish-white spots recurving from costa and decreasing in size posteriorly to a minute dot; a lower marginal series of almost obsolete dots; sericeous streak long, slender. Hind wing paler, the discoidal patch prominent, the submarginal and marginal spots pale brown.

Expanse $3\frac{1}{2}$ to $3\frac{3}{4}$ inches.

Hab. S. China; Hong Kong (*Lewis*). In coll. British Museum, and coll. F. Moore.

In both sexes of this species the blue gloss of the fore wing does not extend beyond the submarginal spots; in this respect they approach nearest *I. irawada*, as they also do in the obsolescence of the marginal rows of spots.

Mr. G. Lewis has recently presented specimens of this species to the British Museum, which he found common in Hong Kong flying over the Lantana.

4. ISAMIA SINICA, n. sp.

Both sexes have a comparatively more triangular form of fore wing than in typical *I. superba*; these wings have similar but less glossy blue, the sericeous streak is shorter, the discal blue spots and the one at end of the cell small, the submarginal series conspicuously larger and whiter, the marginal row also white: hind wing with two rows of whity-brown ill-defined spots.

Expanse 3¼ to 4 inches.

Hab. S. China. In coll. F. Moore.

5. ISAMIA MIDAMUS. (Plate XXXII. fig. 5, ♂.)

Papilio midamus, Linnæus, Syst. Nat. ed. x. p. 470 (1758), xii. p. 765 (1767); De Geer, Acta Holmiæ, ix. p. 209, pl. 6. f. 1, 2, ♀ (1748); Ehret, Plantæ et Papilion. pl. xi., ♂ (1748).

Papilio midamus (part.), Linn. Mus. Lud. Ulricæ, p. 251 (1764); Fabricius, Syst. Ent. p. 479; Spec. Ins. ii. p. 52; Ent. Syst. iii. 1, p. 39.

Limnas mutabilis midamis, Hübner, Samml. exot. Schmett. i. pl. 24. f. 3, 4 (1806), *female*.

Euplœa midamus (part.), Butler, P. Z. S. 1866, p. 294.

Euplœa superba (part.), Doubleday & Hewits. D. Lep. p. 87; Moore, Catal. Lep. Mus. E.I. C. i. p. 131; Butler, Catal. Fabr. Lep. B. M. p. 2; P. Z. S. 1866, p. 271; Kirby, Catal. D. Lep. p. 9.

Nearest to *I. alopia*; fore wing with larger discal blue spots, comparatively smaller and less prominent white submarginal and marginal spots; hind wing with a submarginal and marginal row of very small white spots.

Expanse 3¾ to 4 inches.

Hab. S. China, Canton. In coll. F. Moore; British Museum.

The identification of the *P. midamus* of Linnæus rests entirely on the first published description in the 10th edit. of the 'Systema Naturæ.'

This description also agrees with the figures (Acta Holm. pl. 6. f. 1, 2), which are those of a female, and which Linnæus therein cites as an illustration, as pointed out by Mr. Butler in his Monograph of *Euplœa* (P. Z. S. 1866, p. 294). Of Linnæus's other cited illustrations, Ehret's plate xi. also refers to a male of the same species.

Here, therefore, we have all that is required for fixing the identity of the species in question; and I unhesitatingly apply it to the form of the *superba* group here described.

All recent authors, when referring to the *P. midamus* of Linnæus, have applied the name to a common and well-known Indian and Malayan species of the genus *Trepsichrois*[1]. This erroneous identification doubtless arose from Linnæus also citing Ehret's plate 3 as one of the illustrations of his *P. midamus*, this figure well representing a male *Trepsichrois*.

6. ISAMIA ALOPIA. (Plate XXXII. fig. 7, ♂.)

Danais alopia, Godart, Enc. Méth. ix. p. 177 (1819), ♂ ♀.

Papilio superba, Herbst, Nat. Ins. vi. pl. 102. f. 1, 2, ♀ (nec pl. 119. f. 3).

Euplœa superba (part.), Doubl. & Hewits. D. Lep. p. 87; Moore, Catal. Lep. Mus. E.I. C. i. p. 131; Butler, Catal. Lep. Fabr. B. M. p. 2; P. Z. S. 1866, p. 271; Kirby, Catal. D. Lep. p. 9.

Distinguished by the prominency of the markings on both wings in the male and female, the two marginal rows of spots on the hind wing being large, white, and conspicuously prominent, the inner row of spots long and oval.

Hab. S. China. In coll. F. Moore.

7. ISAMIA MARSEULI, n. sp.

Euplœa marseulii, Boisduval, MS.

Allied to *I. margarita*. Differs on the fore wing in the blue tint being confined more to the base, the marginal spots being quite obsolete, and the sericeous streak only half the width, though of the same length. On the hind wing the two submarginal rows of spots are very indistinct.

Expanse $3\frac{4}{10}$ inches.

Hab. Saigon, Cochin China. In coll. Mons. C. Oberthür.

8. ISAMIA GROTEI.

Euplœa grotei, Felder, Reise Novara, Lep. ii. p. 339 (1867), ♂ only.

Hab. Cochin China.

Closely allied to *I. margarita*.

The female insect described and figured by Felder (Nov. Voy. pl. 41. f. 7) as that sex of *E. grotei*, is the female of *Stictoplœa harrisii*, Felder.

9. ISAMIA MARGARITA. (Plate XXX. fig. 5, ♂.)

Euplœa margarita, Butler, Proc. Zool. Soc. 1866, p. 279; Distant, Rhop. Malayana, p. 31.

Salpinx margarita, Butler, Journ. Linn. Soc., Zool. xiv. p. 294.

Euplœa (Salpinx) margarita, Marshall and de Nicéville, Butt. of India, p. 64 (1882).

Euplœa (Salpinx) adamsoni, Marshall, Journ. Asiatic Soc. Bengal, 1880, p. 245, ♂.

Euplœa frischii, Boisduval, MS.

Hab. British Burmah; Tenasserim; Malacca; Penang.

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[1] See p. 283, *antè*.

10. ISAMIA BRAHMA, n. sp.

Euplœa margarita, Distant, Rhop. Malayana, pl. 4. fig. 3, ♂.

Near to *I. margarita*. Smaller in size: fore wing shorter, not so broad; the exterior margin more oblique, with an intense violet-blue gloss extending three fourths of the wing; a single minute indistinct blue dot at end of the cell, and one on costa above it; a white dot near posterior angle; the sericeous streak is only half the length of that in *I. margarita*: hind wing with two rows of small white spots.

Expanse 3½ inches.

Hab. Hatseiga, Moulmein. In coll. F. Moore.

Has much the appearance of *Menama tavoyana*.

11. ISAMIA DEJEANI.

Euplœa dejeanii, Boisduval, MS.; Distant, Rhopalocera Malayana, p. 29, pl. 4. fig. 1, ♂ (1882).

Near to *I. chloë*: fore wing comparatively broader; the exterior margin less oblique; the posterior margin longer; both the subapical and marginal rows of spots are all nearly obsolete, showing only minute dots between the radial and upper median veins, and three between lower median and submedian; the sericeous streak is one third less in length: hind wing with the marginal rows of spots smaller; the inner series more straightly disposed.

Female. Paler than male; both rows of spots on fore wing brownish white, and with some indistinct discal and costal spots: hind wing marked as in male.

Expanse 3½ inches.

Hab. Sumatra (*Boisd.*); Malacca (*Distant*). In colls. Mons. C. Oberthür, British Museum, F. Moore, and W. L. Distant.

12. ISAMIA RAFFLESI, n. sp.

Male. Fore wings narrower than in *I. dejeanii*. Upperside uniform dark olive-brown, glossed with golden brown: fore wing with a submarginal row of seven small white spots, a marginal lower series of smaller and very indistinct white spots; a very slender short sericeous streak between lower median and submedian veins: hind wing with a prominent ochreous-white discoidal patch, and two marginal rows of small white spots, the inner row decreasing in size to anal angle, the outer row being of uniform size. Underside paler: fore wing with both rows of marginal spots more distinct; a small spot at lower end of the cell; another contiguous spot between the upper and middle median veins, and an elongated spot below the latter: hind wing with both marginal rows of spots as above; a small spot near the cell between the first and second subcostal veins, and another between the upper and middle median veins.

Female. Slightly darker; the marginal rows of spots the same, except that the inner row are larger.

Expanse 3½ inches.

Hab. Java (*Wallace*). In coll. Messrs. Godman and Salvin.

13. ISAMIA FABRICII, n. sp.

Euplœa fabricii, Boisduval, MS.

Near to *I. rafflesi*. Upperside uniform olive-brown: fore wing with the sericeous streak somewhat longer and placed nearer the base; the submarginal row of spots less distinct, the marginal row being almost obsolete: hind wing with the two rows of very small spots, the inner row obsolete from the upper median.

Expanse $3\frac{5}{10}$ inches.

Hab. Cochin China. In coll. Mons. C. Oberthür.

14. ISAMIA CHLOË. (Plate XXIX. fig. 7, ♂.)

Danais (*Euplœa*) *chloë*, Guérin, in Delessert's Voy. Inde, ii. p. 71 (1843).

Salpinx chloë, Butler, Journ. Linn. Soc., Zool. xiv. p. 295.

Euplœa chloë, Distant, Rhop. Malayana, p. 30, pl. 4. fig. 2, ♂, pl. 2. fig. 5, ♀.

Euplœa clerckii, Boisduval, MS., ♀.

Hab. Malay peninsula (Province Wellesley).

15. ISAMIA SINGAPURA, n. sp.

Nearest to *I. chloë*.

Male and Female. Of a more uniform and duller tint, the colour being dark olive-brown; in the male the basal area is slightly pitchy brown and washed with violet-blue[1] in certain lights; the five apical spots on fore wing similar but more prominent and narrower, followed by two pale obsolete spots and a minute white dot at the posterior end; the marginal dots less distinct; the sericeous streak somewhat narrower and less distinct: hind wing with smaller spots. Underside much greener olive than in *I. chloë*; all the spots on both wings more distinct; the discal spots on hind wing very prominent.

Expanse, ♂ $3\frac{3}{4}$ inches.

Hab. Singapore. In coll. British Museum.

16. ISAMIA SOPHIA, n. sp.

Male. Similar to *I. singapura*, but somewhat paler and of an ochraceous olive-brown colour, without any violet-blue reflections; the spots of the inner row on the fore wing comparatively shorter, and the outer row larger: hind wing similar; the two rows of spots also similar.

Female paler than the same sex of *I. singapura*, with the apical spots much more distinct, and the rows on the hind wing much smaller.

Expanse, ♂ $3\frac{4}{8}$, ♀ $3\frac{7}{8}$ inches.

Hab. Sumatra (*Buxton*). In colls. F. Moore and British Museum.

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[1] In typical Malaccan specimens of *I. chloë* the blue gloss is prominent, and extends over two thirds of the wing.

17. Isamia ægyptus.

Euplœa ægyptus, Butler, Proc. Zool. Soc. 1866, p. 277.
Salpinx ægyptus, Butler, Journ. Linn. Soc., Zool. xiv. p. 295.
Hab. S. Borneo; Billiton; Sumatra.

18. Isamia lowei, n. sp.

Nearest to *I. ægyptus*. Upperside olivaceous-brown, palest externally; no bluish-violet tint; apical white spots larger; no marginal spots: hind wing with very small and indistinct submarginal and marginal spots.

Expanse 3¼ inches.

Hab. Borneo. In coll. Mons. C. Oberthür.

19. Isamia dameli, n. sp.

Duller-coloured than in any of the allied forms of *I. chloë*. Upperside dark fuliginous-brown: fore wing also smaller and comparatively narrower, with five upper submarginal distinct white spots two thirds less in size, and one above posterior angle; a marginal row of five central and three lower very minute spots; sericeous streak narrow: hind wing with two rows of very small white spots; discoidal patch brighter-coloured.

Expanse 3⅜ inches.

Hab. Shanghai (*Damel*). In coll. G. Semper.

Tiruna, n. g.

Fore wing comparatively shorter than in typical *Isamia*; costa less arched; exterior margin less oblique, somewhat rounded towards the apex and less convex at the posterior angle; the posterior margin very convex; upper discocellular with a short spur emitted within the cell; sericeous brand narrow, strongly impressed: hind wing shorter and broader, with a distinct discoidal glandular patch.

Type *T. roepstorffi*.

1. Tiruna roepstorffi, n. sp. (Plate XXXII. fig. 8, ♂.)

Male. Colour and pattern of markings similar to *Karadina andamana*. Pale olive-brown, but darker than in *K. andamana*: fore wing with a similarly disposed marginal and submarginal row of olivaceous-white spots; the marginal series smaller, conical, and terminating at the apex; the three lower submarginal spots indented on their outer edge; a discal row of much paler spots, and a similar rounded spot at lower end of the cell; sericeous streak blackish: hind wing with two rows of spots; the marginal row smaller, conical, and the submarginal narrower than those in *K. andamana*; discoidal patch olivaceous-white.

Expanse 3½ inches.

Hab. Andaman Isles. In coll. G. Semper.

2. TIRUNA OCHSENHEIMERI.

Euplœa ochsenheimeri, Lucas, Revue et Mag. Zool. 1853, p. 315, ♂ (nec Moore).

The type specimen of this species is smaller than *Isamia chloë*, somewhat paler and without any blue gloss on the basal area: fore wing with the two costal spots above the cell, and the submarginal series more prominent, larger, and white; the marginal row also more distinct; an indistinct brownish-white spot at lower end of the cell, and a discal series of four spots beyond; sericeous streak short and black: on the hind wing the marginal and upper submarginal row of three spots are less distinct.

Expanse, ♂ 3 inches.

Hab. Java. In coll. Paris Museum.

The above description is taken from the type specimen in the Paris Museum, for the opportunity of examining which I am indebted to the kindness of Mons. C. Oberthür. It is the only specimen known to me.

ANADARA, n. g.

Male with comparatively shorter wings than in typical *Isamia*. Fore wing with the costa but slightly arched; apex somewhat acuminate; exterior margin shorter and more oblique, slightly sinuous, more uneven and slightly angular below the apex in female; male with a short, extremely broad but scarcely perceptible sericeous streak: hind margin shorter than in *Isamia*, very convex; first subcostal branch touching the costal; second, third, and fourth branches at equal distances apart and nearer to end of the cell; upper discocellular acutely bent inward at its middle, and emitting a short spur within the cell; cell very broad. Hind wing with a small upper discoidal ochreous glandular patch, the greyish-brown colour of the anterior border extending to the edge of median vein; cell very long and broad at its end.

ANADARA GAMELIA.

Salpinx gamelia, Hübner, Samml. exot. Schmett. Bd. ii. pl. 10. f. 1, 2 (1806–27); Butler, Journ. Linn. Soc., Zool. xiv. p. 295 (1878).

Euplœa gamelia, Butler, P. Z. S. 1866, p. 279.

Euplœa faber, Zinken-Somm. Nova Acta Acad. Nat. Cur. xv. p. 186, pl. 16. figs. 18, 19, ♂ ♀ (1831).

?*Euplœa lorraini*, Chapman, Ent. Monthly Mag. 1873, p. 263, ♀.

Hab. Java.

E. *Two "sexual marks" or scent-producing organs on fore wing.*

DORICHA, n. g.

Fore wing more angular than in typical *Stictoplœa*; costal margin less arched, the apex acute; exterior margin very oblique; posterior margin shorter; angle acute; discocellulars bent in the middle;

lower radial from the angle; no inner spur; male with two lengthened sericeous brands between lower median and submedian veins: hind wing less convex externally.

Type *D. sylvester*.

1. DORICHA SYLVESTER.

Papilio sylvester, Fabricius, Ent. Syst. iii. 1, p. 41 (1793); Donovan, Nat. Rep. iv. pl. 129 (1826).

Euplœa sylvester, Butler, Catal. Fabr. Lep. B. M. p. 3.

Danais sylvestris, Godart, Enc. Méth. ix. p. 182 (1819).

Stictoplœa sylvester, Butler, Journ. Linn. Soc., Zool. xiv. p. 303.

Euplœa melpomene, Butler, P.Z.S. 1866, p. 300, fig. 2 (p. 298), ♂.

Hab. N. Australia (Cape York).

2. DORICHA PELOR.

Euplœa pelor, Doubleday & Hewits. Gen. D. Lep. p. 88, pl. 11. fig. 1 (1847); Chenu, Enc. d'Hist. Nat. *Pap.* p. 64, f. 153.

Stictoplœa pelor, Butler, Journ. Linn. Soc., Zool. xiv. p. 303.

Hab. N. Australia (New Holland).

3. DORICHA (?) ROGERI.

Crastia rogeri, Hübner, Zutrage exot. Schmett. f. 947, 948 (1837), ♀.

Hab. Unknown.

This species does not exist in any of the collections that I have examined.

Genus NARMADA.

Narmada, Moore, Lep. of Ceylon, i. p. 13 (1880).

Euplœa (*Stictoplœa* part.), Marshall & de Nicéville, Butt. of India, p. 90 (1882).

Differs in both sexes from typical *Stictoplœa* in the more triangular form of both the fore wing and hind wing, the fore wing being more acuminate, and the two sericeous brands shorter; upper discocellular with a short spur emitted within the cell.

Pattern of markings like *Crastia* (*core*).

Type *N. coreoïdes*.

1. NARMADA COREOÏDES. (Plate XXIX. fig. 10, ♂).

Euplœa coreoïdes, Moore, Ann. Nat. Hist. ser. 4, xx. p. 44 (1877); Butler, Journ. Linn. Soc., Zool. xiv. p. 301.

Euplœa (*Stictoplœa*) *coreoïdes*, Marshall and de Nicéville, Butt. of India, p. 96 (1882).

Hab. S. India (Nilgiris).

2. NARMADA MONTANA.

Euplœa montana, Felder, Reise Novara, Lep. ii. p. 329 (1867), ♂ ♀.

Narmada montana, Moore, Lep. of Ceylon, i. p. 13, pl. 6. f. 1, ♂ (1880).

Euplœa (*Stictoplœa*) *montana*, Marshall and de Nicéville, Butt. of India, p. 91 (1882).
Euplœa lankana, Moore, Ann. Nat. Hist. ser, 4, xx. p. 44, ♂ (1877).
Stictoplœa lankana, Butler, Journ. Linn. Soc., Zool. xiv. p. 302.
Hab. Ceylon.

3. NARMADA CONSIMILIS.

Euplœa consimilis, Felder, Reise Novara, Lep. ii. p. 329 (1867).
Hab. Java; Sumatra (*Sachs*). In coll. Messrs. Godman and Salvin.

Genus STICTOPLŒA.

Stictoplœa, Butler, Journ. Linn. Soc., Zool. xiv. p. 301 (1878).
Euplœa (*Stictoplœa* part.), Marshall & de Nicéville, Butt. of India, p. 90 (1882).

Male. Wings broad. Fore wing lengthened triangular, costal margin slightly arched, apex somewhat rounded; exterior margin oblique, posterior margin slightly convex; with two broad lengthened sericeous brands between the lower median and submedian veins; upper discocellular with a very short spur emitted within the cell. Hind wing broad, with the costal margin much arched in the middle; exterior margin convex, waved.

Type *S. gloriosa.*

1. STICTOPLŒA HOPEI.

Euplœa hopei, Felder, Reise Novara, Lep. ii. p. 328 (1867), ♂.
Stictoplœa hopei, Butler, Journ. Linn. Soc., Zool. xiv. p. 302.

Male. Smaller than type specimen of *S. binotata*; spots on fore wing similar but smaller: hind wing with a complete row of prominent submarginal white spots, the marginal spots nearly obsolete, except three very minute dots in the middle.

Expanse $3\frac{3}{4}$ inches.
Hab. Assam (*Felder*); Silhet. In coll. British Museum.

2. STICTOPLŒA BINOTATA. (Plate XXX. fig. 4, ♂.)

Stictoplœa binotata, Butler, Journ. Linn. Soc., Zool. xiv. p. 302 (1878).
Euplœa (*Stictoplœa*) *hopei*, Marshall & de Nicéville, Butt. of India, p. 92, pl. 2. f. 18, ♂ ♀ (1882).
Hab. Silhet, Cachar, Darjiling. In coll. British Museum.

3. STICTOPLŒA REGINA, n. sp.

Comparatively smaller than *S. binotata*: fore wing of a violet-blue with less gloss; submarginal spots half the size of those in that species, the discal spots reduced to the two between the radial and middle median, and a very minute spot at lower end of the cell: hind wing deep rufous-brown, immaculate.

Expanse, ♂ $3\frac{1}{2}$ inches.
Hab. Cachar. In coll. British Museum.

4. STICTOPLŒA HARRISI. (Plate XXX. fig. 8, ♂.)

Euplœa harrisii, Felder, Reise Novara, Lep. ii. p. 328, ♂ (1867).

Euplœa grotei (♀ only), Felder, loc. cit. p. 339, pl. 41. f. 7, ♀.

Stictoplœa grotei, Butler, Journ. Linn. Soc., Zool. xiv. p. 302; Moore, P. Z. S. 1878, p. 824.

Euplœa (Stictoplœa) grotei, Marshall and de Nicéville, Butt. of India, p. 91 (1882).

Eulpœa grotei, Distant, Rhop. Malayana, p. 36, pl. 3. f. 3, ♂ (1882).

Euplœa boisduvalii, Roger, MS., ♀.

Hab. Cochin China (*Felder*), Upper Tenasserim, Moulmein, Malacca. In coll. British Museum and F. Moore.

The insect described by Dr. Felder as the male of *E. grotei* is a species of *Isamia*.

5. STICTOPLŒA TYRIANTHINA, n. sp.

Male. Upperside—fore wing similar to that of *S. harrisii*, the blue marginal spots less distinct above the posterior angle, the two sericeous streaks each one third shorter and not quite so broad as in that species: hind wing with only three small white upper submarginal spots, the marginal spot being scarcely visible. Underside similar; the marginal spots on fore wing less distinct, the marginal series on the hind wing and the upper submarginal spots small.

Expanse 3½ inches.

Hab. Borneo (*Pryer*); Sumatra (*Bock*). In coll. F. Moore and H. G. Smith.

6. STICTOPLŒA PYGMÆA, n. sp.

Allied to *S. microsticta*. Smaller in size: fore wing in both sexes with smaller discal spots and larger marginal spots, the latter series triangular in form in the male and somewhat confluent with the marginal series in the female, the marginal dots being more distinct; the cell-spot is also larger. Hind wing in male with three upper submarginal minute spots only, the female also showing indistinct marginal spots.

Expanse, ♂ 3, ♀ 3⅛ inches.

Hab. Cachar. In coll. British Museum.

In *S. microsticta* the expanse of male is 3⅞ inches.

7. STICTOPLŒA MICROSTICTA.

Stictoplœa microsticta, Butler, Journ. Linn. Soc., Zool. xiv. p. 302 (1878).

Hab. ——? In Banksian coll., British Museum.

8. STICTOPLŒA PICINA.

Euplœa picina, Butler, Proc. Zool. Soc., 1866, p. 280, pl. 30. f. 1, ♂.

Stictoplœa picina, Butler, Journ. Linn. Soc. Zool. xiv. p. 302.

Hab. Sumatra.

9. STICTOPLŒA INCONSPICUA.

Stictoplœa inconspicua, Butler, Journ. Linn. Soc., Zool. xiv. p. 302, ♂ (1878).

Hab. Sumatra.

10. STICTOPLŒA LACORDAIREI, n. sp.

Euplœa lacordairei, MS. Hewits. coll.

Male. Fore wing dark purplish violet-brown; suffused externally with blue; a submarginal row of six violet-white spots, the upper one minute, the second and fifth the largest, third, fourth, and sixth of equal size; two narrow sericeous streaks. Hind wing pale brown, darker at the base, with a submarginal upper row of three small white spots.

Expanse 3¼ inches.

Hab. Java. In coll. Hewitson, British Museum.

11. STICTOPLŒA GLORIOSA.

Euplœa gloriosa, Butler, P. Z. S. 1866, p. 293, pl. 29. f. 4, ♀.

Stictoplœa gloriosa, Butler, Journ. Linn. Soc., Zool. xiv. p. 301 (1878).

Euplœa superba, Vollenhoven, Tijd. voor Ent. ser. 2, i. p. 209, pl. 10. f. 1, ♂ (1866).

Euplœa schlegelii, Felder, Reise Novara, Lep. ii. p. 327, pl. 41. f. 5, ♂ (1867).

Euplœa badoura, Kirby, Syn. Catal. D. Lep. p. 16 (1871).

Hab. Celebes.

12. STICTOPLŒA LÆTIFICA.

Euplœa lætifica, Butler, Proc. Zool. Soc. 1866, p. 292, pl. 29. fig. 3, ♀.

Stictoplœa lætifica, Butler, Journ. Linn. Soc., Zool. xiv. p. 302.

Hab. Philippine Islands.

13. STICTOPLŒA DUFRESNEYI.

Danais dufresneyi, Godart, Enc. Méth. ix. p. 815 (1823).

Hab. Philippines.

14. STICTOPLŒA SWINHOEI.

Euplœa swinhoei, Wallace, Proc. Zool. Soc. 1866, p. 358.

Stictoplœa swinhoei, Butler, Journ. Linn. Soc., Zool. xiv. p. 302.

Hab. Formosa. In coll. Messrs. Godman and Salvin.

15. STICTOPLŒA PALLA.

Euplœa palla, Butler, Proc. Zool. Soc. 1866, p. 284.

Stictoplœa palla, Butler, Journ. Linn. Soc., Zool. xiv. p. 303.

Euplœa payeni, Felder, Reise Novara, Lep. ii. p. 329 (1867).

Hab. Aru Islands.

16. STICTOPLŒA WATSONI, n. sp.

Male. Dark purplish violet-brown, suffused with intense but not shining blue in some lights. Fore wing with a submarginal medial row of four very small blue spots, the upper spot somewhat largest and dentate; two long sericeous streaks. Hind wing with a submarginal upper series of three geminated bluish-white spots followed by three single small spots.

Expanse 4¼ inches.

Hab. Bouru (*Wallace*). In coll. Hewitson, British Museum.

17. STICTOPLŒA INÆQUALIS.

Stictoplœa inæqualis, Butler, Journ. Linn. Soc., Zool. xiv. p. 302, ♂ (1878).

Hab. Amboina.

18. STICTOPLŒA MŒSTA.

Euplœa mœsta, Butler, Proc. Zool. Soc. 1866, p. 284, fig. 3 (p. 281), ♂.

Stictoplœa mœsta, Butler, Journ. Linn. Soc., Zool. xiv. p. 303.

Hab. New Guinea (Dorey, Port Moresby).

19. STICTOPLŒA IMMACULATA.

Stictoplœa immaculata, Butler, Journ. Linn. Soc., Zool. xiv. p. 303, ♂ ♀ (1878).

Hab. New Guinea (Port Moresby).

20. STICTOPLŒA PAPUANA.

Euplœa papuana, Reakirt, Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 240.

Hab. New Guinea.

21. STICTOPLŒA DOLESCHALLII.

Euplœa doleschallii, Felder, Wien. ent. Monats. iii. p. 267, pl. 5. f. 2 (1859).

Stictoplœa doleschallii, Butler, Journ. Linn. Soc., Zool. xiv. p. 303.

Hab. New Guinea (Port Moresby).

22. STICTOPLŒA TRISTIS.

Euplœa tristis, Butler, Proc. Zool. Soc. 1866, p. 284.

Stictoplœa tristis, Butler, Journ. Linn. Soc., Zool. xiv. p. 303.

Hab. New Hebrides (Aneiteum).

The following species, referred by authors to the genus *Euplœa*, have not been verified:—

EUPLŒA DRYASIS.

Papilio dryasis, Fabricius, Ent. Syst. iii. p. 39 (1793); Jones, Icon. t. 85. fig. 1; Donovan, Nat. Repos. v. pl. 158 (1827); Butler, Catal. Fabr. Lep. Brit. Mus. p. 3.

Hab. Unknown.

EUPLŒA INCOMPTA.

Euplœa incompta, Herr.-Schäffer, Stett. ent. Zeit. 1869, p. 69.

Hab. Fiji Islands.

EUPLŒA ENCELADUS.

Papilio enceladus, Linn. Syst. Nat. p. 470 (1758); Mus. Ulr. p. 254 (1764); Syst. Nat. i. 2, p. 766 (1767).

"*Alis integerrimus fuscis, punctis marginalibus disco octo albis. Corpus nigrum albo punctatum. Alæ omnes utrinque fuscæ. Margo exterior punctis* 12 *circiter albis. Puncta circiter* 7 *alba inæqualia dispersa per discum absque ordine.*"

"*Hab.* in Indiis."

The type specimen of this species is not now in the "Ulrica" collection; it is not enumerated in Thunberg's List of the "Ulrica" collection, published in 1804. Dr. Aurivillius, in his recently published Memoir (Kongl. Svenska Akad. Handl. xix. p. 63), refers it doubtfully to the genus *Euplœa*.

Brown, in Illust. of Zoology, pl. 17, figures a species of *Amauris*, and states that "it is probably a variety of the *P. enceladus*, Linn." The description, however, does not fit any species of that genus with which I am acquainted. Mr. Butler tells me that it may be near the *Danais mytilene*.

EXPLANATION OF THE PLATES.

PLATE XXIX.

GROUPS OF MIMETIC SPECIES.

In *Limnaina*.	Fig. 1.	*Radena juventa* ♂, p. 224.
	2.	*Tirumala conjuncta* ♂, p. 231.
Between *Limnaina* and *Euplœina*.	3.	—— *septentrionis* ♂, p. 231.
	4.	*Trepsichrois linnæi* ♀, p. 286.
In *Euplœa*, Group A.	5.	*Tronga bremeri* ♂, p. 267.
	6.	*Crastia distanti* ♂, p. 278.
	7.	*Isamia chloë* ♂, p. 315.
In *Euplœa*, Group B.	8.	*Crastia core* ♂, p. 277.
	9.	*Pademma kollari* ♂, p. 309.
	10.	*Narmada coreoïdes* ♂, p. 318.

PLATE XXX.

In *Euplœa*, Group C.	Fig. 1.	*Trepsichrois linnæi* ♂, p. 286.
	2.	*Penoa deione* ♂, p. 275.
	3.	*Isamia splendens* ♂, p. 311.
	4.	*Stictoplœa binotata* ♂, p. 319.
In *Euplœa*, Group D.	5.	*Isamia marginata* ♂, p. 313.
	6.	*Menania tavoyana* ♂, p. 265.
	7.	*Penoa limborgii* ♂, p. 275.
	8.	*Stictoplœa harrisii* ♂, p. 320.

PLATE XXXI.

Fig. 1. *Limnas alcippoides* ♂, n. sp., p. 238.
2. *Salatura nipalensis* ♂, p. 240.
3. *Tirumala gautama* ♀, p. 231.
4. *Radena persimilis* ♀, p. 223.
5. *Menama lorzæ*, n. sp., ♂, p. 265.
6. —— *mouhotii*, n. sp., ♂, p. 265.
7. *Crastia camorta* ♂, p. 279.
8. *Pramasa mitra* ♂, p. 281.

PLATE XXXII.

Fig. 1. *Pademma klugii* ♂, p. 305.
2. —— *dharma*, n. sp., ♀, p. 306.
3. —— *indigofera*, n. sp., ♂, p. 306.
4. —— *macclellandii*, n. sp., ♀, p. 308.
5. *Isamia midamus* ♂, p. 312.
6. *Pademma pembertonii*, n. sp., ♂. p. 308.
7. *Isamia alopia* ♂, p. 313.
8. *Tiruna roepstorffii*, n. sp., ♂, p. 316.

2. On new *Clausiliæ* from the Levant, collected by Vice-Admiral T. Spratt, R.N. By Dr. O. BOETTGER, Frankfort-on-the-Main[1].

[Received April 10, 1883.]

(Plates XXXIII. & XXXIV.)

In 1878, in a dissertation entitled 'Monographie der Clausilien-section *Albinaria*,' I tried to show that scarcely one of the more known genera of land-shells presents us such instances of restricted local distribution as the section of the "fair white ones" of *Clausilia*, and that through this strange restriction of habitat these forms of shells, isolated for a long time upon generally unfrequented islands, have deviated from their primitive type already so far that we must acknowledge them to be distinct and now independent species. Of a great number, especially of the island-species, there is evidence sufficient to indicate the prototype with more or less certainty, and that above all others *C. cærulea*, Fér., or its ancestor seems to be the primary form for a great number of varieties or allied species. In no group is the limitation of the definitions "species, subspecies, and variety" more delicate and more difficult than here, because it seems to depend only on the time, or, rather, on the earlier or later age of the immigration or isolation, whether a form has developed already into a so-called "good species" or not. Also, if in an earlier time, and then again in a more recent period, the same species has immigrated from a neighbouring island into another island, then it may happen, as we see now in the island of Amurgo, that two clearly distinct species, *C. amorgia*, Bttg., and *C. cærulea*, Fér., arise, which are both derived from one and the same ancestor, viz. from a form doubtless quite near to the present *C. cærulea*.

It is evident that, in producing the astonishing variety of species and forms of *Clausilia* in the Greek islands, "isolation" was one of the principal factors, and that the question about "struggle for life" or "natural selection" was but secondary to it.

The following descriptions of a great number of new species, varieties, and forms of Greek *Clausiliæ* will give us new grounds and proofs to illustrate these short theoretical reflections.

With the knowledge of these new forms we advance more and more in the science of the geographical distribution of this genus;

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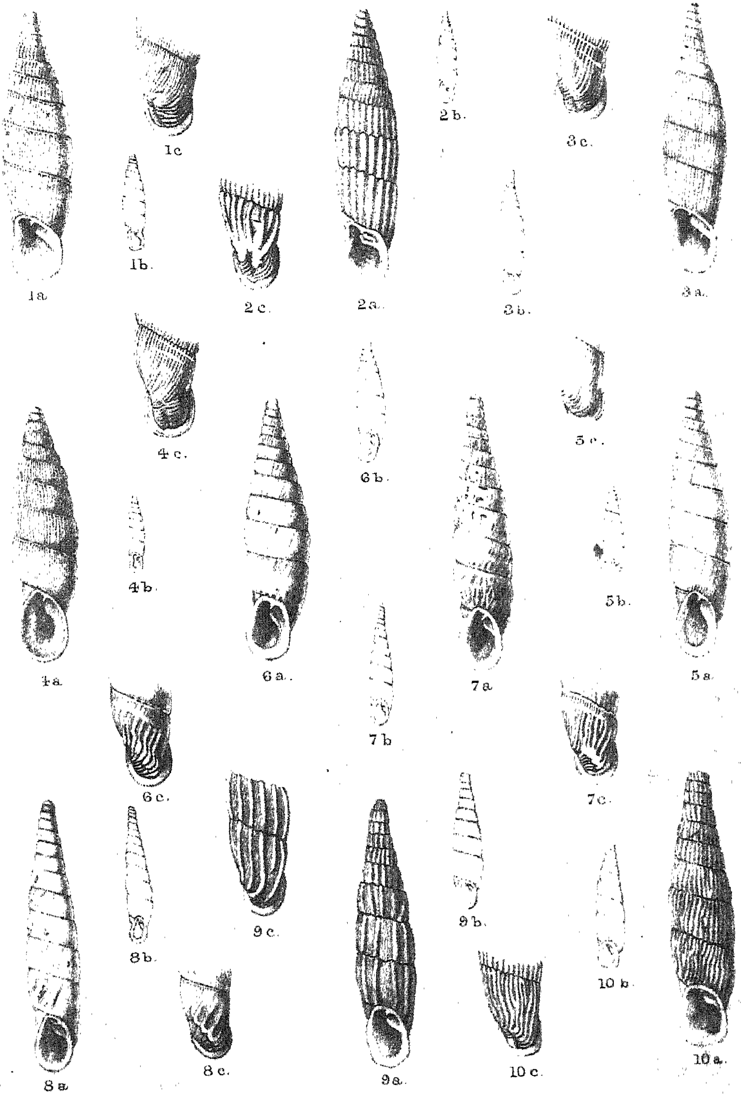
[1] Communicated by Vice-Admiral T. Spratt, R.N., F.R.S., F.Z.S.

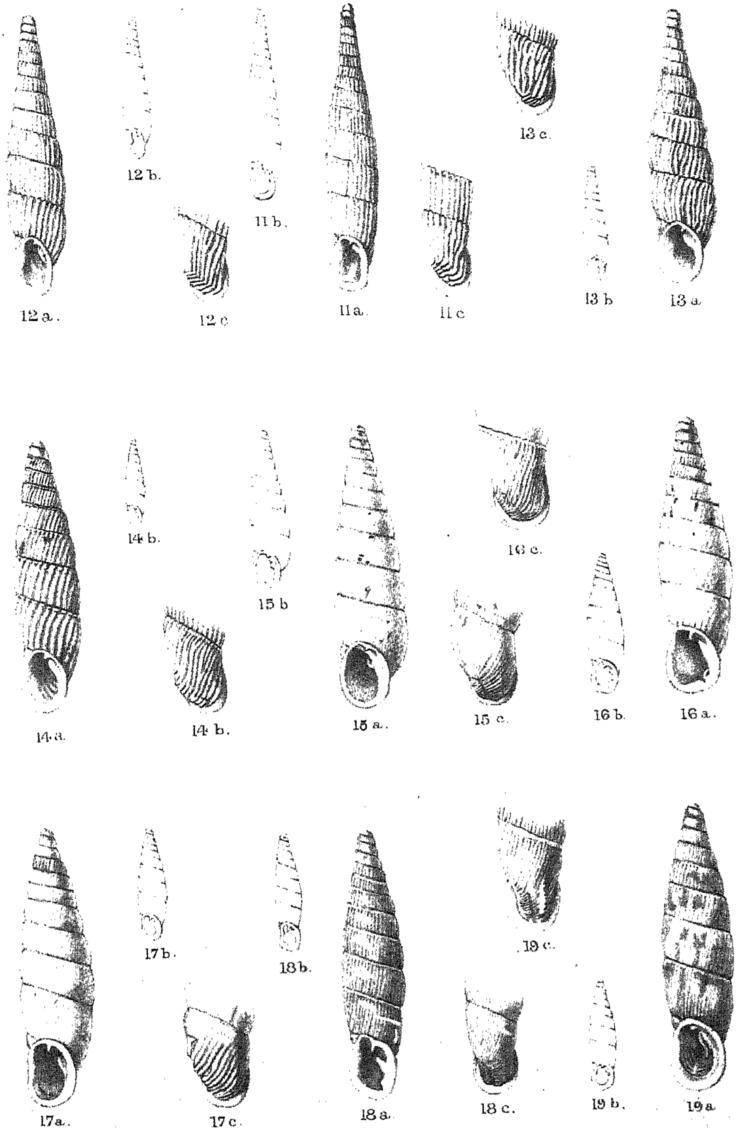
P Z S. 1883. Pl. XXXIII.



Edwin Wilson, lith.

Mintern Bros. imp

NEW CLAUSILIÆ.



12 b. 13 c. 11 b. 12 a. 12 c 11 a. 11 c 13 b 13 a.

14 b. 16 c. 15 b 14 a. 14 b. 15 a. 15 c. 16 b. 16 a.

19 c. 17 b. 18 b. 17 a. 17 c. 18 a. 18 c. 19 b. 19 a.

Edwin Wilson, lith.

Mintern Bros. imp.

NEW CLAUSILIÆ.

so that from some few small islands only, viz. from the Greek islands Schiza, Cerigotto, Spetsæ, Hydra, Makronisi, Petali, Skopelo, Chilodromi and its neighbour islands, and from Giura, Serpho, Polykandro, and Sikono, and from the little islands between Nio, Naxia, and Amurgo, species of *Clausilia* have not yet been found. Much less known are the islands of the coast of Asia Minor, where the islands of Thaso, Samothraki, Imbro, Limni, Tenedo, Hagiostrati, Psara, Furni, Patmo, and all the islands of the Mendelia Gulf, Nisyro and all the islands of the Symi Gulf, lastly the Tanni and Kamila islands, have not yet disclosed any one of their doubtless numerous forms of this genus.

I am greatly indebted to Miss Joséphine Thiesse, of Chalkis, island of Eubœa, who for several years has kindly offered me her new treasures in Greek *Clausiliæ* for publication, and especially to Vice-Admiral T. Spratt, R.N., who has opened to me his rich collection for this paper.

The collection of these interesting little shells was commenced about forty years ago by Admiral Spratt, when Edward Forbes became the naturalist of H.M.S. 'Beacon,' in which ship he was employed on the survey of the Grecian archipelago. Forbes's genial nature as well as example stimulated the little taste for natural history the Admiral (then a Lieutenant) previously possessed, and induced him to collect fossils and shells.

When they were companions together afterwards in exploring Lycia, and also in several trips amongst the Greek islands, the little *Clausiliæ* came frequently into notice, from their abundance in some localities, and from being the only land-shells found alive upon the rocky heights and cliffs during the hot and arid summers of the Ægean.

From being thus so conspicuous, and also from showing great varieties of form, they became special favourites of the collector after Forbes returned to England.

Thus from mountain-tops and lower gorges, from large and small islands, they were assiduously sought for as opportunities offered, and were collected as experience showed the best side of the mountain or particular rock to look for them, and whether on its surface or under stones only, as chiefly occurs with the brown species.

Admiral Spratt's collection of *Clausiliæ* consequently amounts to more than 100 forms from nearly as many different localities, of which I have seen examples of the greater portion.

About half this collection was formed before the year 1848; and of these, through Edward Forbes and Mr. H. Cuming, to whom sets were sent, the most part, but not all, were submitted to the late Dr. Louis Pfeiffer, of Cassel, for examination. Dr. Pfeiffer found about thirty of them to be new species, and described them in the 'Proceedings' of this Society.

As regards the remainder of the collection, formed between 1852 and 1864, the loss of his fellow-traveller and friend before his return to England in the latter year so damped Admiral Spratt's interest in his collections, that the *Clausiliæ* and other specimens have remained until recently unexamined, so that many species that were unknown to science at that time have been since collected by others and described.

I have, however, now the pleasure of presenting descriptions and figures of some 13 new species, as well as of about 18 new varieties and forms, to the Society, out of the remainder of the Admiral's collection, which he has recently submitted to me for that purpose.

Sect. *Albinaria*, v. Vest.

1. CLAUSILIA ANATOLICA, Roth. Dissert. p. 21, t. 2. fig. 5.

Var. APICALIS, mihi.

Typo minor, spira breviore, apice latissimo, obtusissimo. Anfr. solum 8. *Lamella infera intus minus distincte bifurcata. Alt.* 14½, *lat.* 4¼ *mm.; alt. apert.* 3¾, *lat. apert.* 3¼ *mm.*

Hab. Arsa, valley of Xanthus, Asia Minor (*Spratt*).

The short form and the very thick apex distinguish this variety easily from the typical *C. anatolica* of Cacamo in Caria.

2. CLAUSILIA IDÆA, Pfr. P. Z. S. 1849, p. 140.

This fine species, inhabiting Mount Ida, island of Crete, which Admiral Spratt collected on the Plain of Neetha at 4000 feet alt., must be registered between *C. petrosa*, P., and *C. byzantina*, Chrp., in the *byzantina* group of *Albinaria*.

3. CLAUSILIA GLABELLA, Pfr. P. Z. S. 1864, p. 604.

I do not yet know the type of this species, inhabiting the "White Mountains" at 6000 feet alt. (*Spratt*); but I am now sure that my *C. pura* (Monogr. d. Claus.-Sect. *Albinaria*, p. 22, t. 4. fig. 1) and *C. deglupta* (*l. c.* p. 23, t. 1. figs. 2, 3), both Cretan forms, are but varieties of Dr. Pfeiffer's species.

Var. PURA, Bttg.

A typical specimen from Apokorona, island of Crete (*Spratt*).

Var. SPRATTI, mihi.

Typo multo major, cylindrato-fusiformis; apert. intus hepatica. Lam. supera longiuscula sed humilis; subcolumellaris oblique intuenti distincte conspicua. Differt a varietatibus pura, *Bttg., nec non* deglupta, *Bttg., anfr.* 13½, *et lam. subcolumellari haud inconspicua. Alt.* 25½, *lat.* 4½ *mm.; alt. apert.* 4¾, *lat. apert.* 3½ *mm.*

Hab. Island of Crete, without exact indication of locality (*Spratt*).

This splendid variety, 5 mm. greater than usual, differs from all varieties of this species till now known by its elongate cylindrical form and by the distinctly outcoming subcolumellar lamella.

4. CLAUSILIA STRIGATA, Pfr. P. Z. S. 1849, p. 136.

A nearly typical specimen of this species, which had been found till now in the neighbourhood of Mylopotamo, Rettimo, and Khania, from the Omalo Plain at 3500 feet alt., island of Crete (*Spratt*).

Var. ORIENTALIS, mihi.

Typo minor, testa tenuiore, costulis anfr. mediorum acutioribus, minus undulatis, ultimi vix validioribus. Lam. infera intus minus distincte bifurcata e basi vix callosa ascendens. Alt. $14\frac{1}{2}$–15, *lat.* $3\frac{1}{2}$–$3\frac{3}{4}$ *mm.; alt. apert.* $3\frac{1}{4}$, *lat. apert.* $2\frac{3}{4}$ *mm.*

Hab. Karpatho island (*Spratt*).

A very characteristic little variety.

5. CLAUSILIA VIRGINEA, Pfr. Symbol. iii. p. 95.

Admiral Spratt found this smooth little species in the Pass of Prevli and a slight variety at Sitia (?), island of Crete.

6. CLAUSILIA SUBVIRGINEA, n. sp. (Plate XXXIII. fig. 1.)

Maxime aff. C. virgineæ, *sed t. minus ventricosa, apert. multo minore. T. minus solida, albida, maculis punctisque cinereis hic illic adspersa, opaca. Anfr.* $10\frac{1}{2}$, *apicales 2 læves, infra-apicales 3 distanter, cæteri dense acute striati, ultimus prope aperturam vix validius densestriatus. Apert. parva, minus alta, magis rotundata; lam. supera minus longa, spiralem disjunctam non transgrediens; infera superæ minus approximata, basi magis oblique ascendente nec subhorizontaliter in mediam aperturam prosiliente. Cæterum* C. virgineæ, *P., simillima. Alt.* 14, *lat.* $3\frac{1}{2}$ *mm.; alt. apert.* $3\frac{1}{4}$, *lat. apert.* $2\frac{1}{2}$ *mm.*

Hab. Island of Crete, without exact indication of habitat (*Spratt*).

This little species is very closely allied to *C. virginea*, Pfr., but neither so ventricose nor so smooth and polished in the median whorls; its mouth is strikingly smaller, and the base of the inferior lamella ascends in the profile view obliquely in a nearly straight line, whilst in *C. virginea* it shows a concave base and projects more horizontally into the midst of the mouth.

7. CLAUSILIA TROGLODYTES, Ad.Schmidt, Syst. d. europ. Claus. p. 90.

Var. VEXANS, m.

Habitu C. byzantinæ, *Chrp., typicæ, sed apparatu claustrali* C. troglodytis, *Ad. Schm.—Differt a typo punctis cinereis parce adspersa, anfr. mediis glabratis, vix substriatis, apert. minus protracta. Alt.* 21, *lat.* 4 *mm.; alt. apert.* $4\frac{1}{2}$, *lat. apert.* $3\frac{1}{2}$ *mm.*

Hab. Roumili near Tarrha, South Crete (*Spratt*).

This variety has quite the form and size and the glabrated median whorls of the typical *C. byzantina*, Chrp., from Khania; but it is a true *C. troglodytes* the costulation of which has been reduced to a very slight or nearly obsolete striature.

8. CLAUSILIA SUBLAMELLOSA, n. sp. (Plate XXXIII. fig. 2.)

Magnitudine, habitu, sculptura, apertura, lamellis persimilis C. lamellosæ, *Wagn., Dalmaticæ, sed punctiformi-rimata, anfr.* 11 *nec* 9, *ultimo deorsum angustato, basi distincte bicristato, cristis brevibus, parum arcuatis, sulco separatis, crista exteriore validiore, lamellis* *costulata, crista interiore umbilicali densius costulato-striata; costulis lamelliformibus anfr. ultimi prope aperturam sursum hic illic bifidis. Lunella exacte dorsalis, magis minusve perspicua, sat valida; clausilium apice acuto instructum. Alt.* 12–14, *lat.* 2⅔–3 *mm.; alt. apert.* 3, *lat.* 2¼ *mm.*

Hab. Sphakia, west of Crete (*Spratt*).

A wonderful little shell, without attentive examination easily to be confounded with *C. lamellosa*, Wagn., from Ragusa. But the well developed *apparatus claustralis* forbids to range it next to this species, and prohibits also to put it into a series with the Syrian forms *C. prægracilis*, Bttg., and *C. albicosta*, Bttg. The new species seems to be nearly isolated between the Cretan *Clausiliæ*, where it may perhaps have most affinities with the *byzantina* group, and, especially in the neck-form and costulation, with *C. tenuicostata*, Pfr., var. *heteroptyx*, Bttg., in the form and position of the superior and inferior lamellæ with *C. virginea*, Pfr.; but the nearly predorsal lunella is quite peculiar to *C. sublamellosa*.

9. CLAUSILIA TENUICOSTATA, Pfr. P. Z. S. 1864, p. 604.

This species has been known till now from Selino and Lassos and from the Gawdos island in South Crete (*Spratt*). It is also said to occur in the Bay of Mirabello (*Pfeiffer*); but I think it must have been confused with another allied corrugated species.

The specimens from Tripiti, south of Crete (*Spratt*), lying before me, seem to be nearly typical, but are distinguished from Dr. Pfeiffer's diagnosis by the greater size, the more milk-blue colour, and the straighter costulation. This form is moreover endowed with a very deep-lying spiral lamella, whilst in the typical *C. tenuicostata* the lamella spiralis approaches and passes a little the inner end of the lamella supera. Alt. 17–19, lat. 3½–3¾ mm.; alt. apert. 3¾–4, lat. apert. 2½–2¾ mm.

Another specimen, from Roumili, is a new variety, which I shall name

Var. HETEROPTYX, mihi.

Typo simillima, sed anfr. 12½ *sutura crenulata disjunctis, magis stricte recteque costulatis, ultimo costulis aliquantulum rarioribus, acutioribus, fere lamelliformibus, sed cæteris non latioribus ornato. Lam. infera superæ valde approximata, validior, magis horizontaliter in mediam aperturam prosiliens, e basi intuenti callosa subspiraliter intrans. Alt.* 19, *lat.* 3½ *mm.; alt. apert.* 4, *lat. apert.* 3 *mm.*

Hab. Roumili near Tarrha, south coast of Crete (*Spratt*).

This curious shell seems in its whole exterior appearance to be nothing but a large form of *C. tenuicostata*, P.; but on studying with attention the inner plaits, one finds that the figure and position of the inferior lamella is remarkably different. But I cannot believe that this variety, being in its outer form, size, colour, and costulation identical with *C. tenuicostata*, should represent a really distinct species.

The var. *strictecostata*, Bttg. (Mon. d. Claus.-Sect. *Albinaria*, p. 28, t. i. fig. 6), has been found by Admiral Spratt in Sphakia, south of Crete, in a nearly typical specimen. One did not yet know till now any sure locality for this Cretan form, well distinguished from *C. tenuicostata* typica by the costation of the neck, whose ribs are not at all stronger than in the median whorls, and by the deep-lying spiral lamella, which does not approach the lamella supera. Alt. 17½–18½, lat. 3½–4 mm.; alt. apert. 4, lat. apert. 2¾–3 mm.

10. Clausilia candida, Pfr. P. Z. S. 1849, p. 135.

This species, specimens of which Admiral Spratt found near Khania, island of Crete, is absolutely identical with *C. straminea*, Ad. Schmidt, System. d. europ. Claus. 1868, p. 91.

11. Clausilia aphrodite, n. sp. (Plate XXXIII. fig. 3.)

Peraff. C. arthurianæ, *Blanc, sed sordide brunnea, penitus albidocostulata, spira exserta validiusque concave producta, apice concolori. Anfr.* 12½, *exceptis duobus primis confertim capillaceocostulati nec striati, costulis anfr. ultimi antice vix validioribus. Apert. apparatusque claustralis affines, sed peristomate superne magis soluto, faucibus hepaticis; lam. supera minus alta, infera vel stricta vel subconcava nec semicirculari oblique ascendente. Cæterum* C. arthurianæ *simillima, sed plicis lamellisque omnibus, ut videtur, minus validis acutisque. Alt.* 19, *lat.* 4½ *mm.; alt. apert.* 4¼, *lat. apert.* 3½ *mm.*

Hab. Pass over Tylisso near Megalokastron, island of Crete (*Spratt*).

This form is easily distinguished from *C. arthuriana*, Blanc, by the brown colour and the white or grey ribs of its shell, whilst *C. arthuriana*, from Spinalunga island, Crete, is quite isabel-coloured and only very finely striated. So the new species has more the appearance of *C. hippolyti*, Bttg., from Mount Ega, Crete; but it is not spotted like that, and has a more complicated apparatus claustralis.

12. Clausilia thiesseæ, Bttg. (Plate XXXIII. fig. 4.)

Nachr.-Blatt d. d. Malakozool. Ges. 1880, p. 48.

I give here a drawing of this fine shell, not yet figured, which seems to occur not rarely in Akarnania, Morea (*Dr. Theod. Krueper*) and in the neighbourhood of Patras, Morea (*Thiesse* and *Consul Nik. Konéménos*).

13. Clausilia bigibbosa, Charp. Zeitschr. f. Malak. 1847, p. 143.

I possess in my collection the typical form of this species from Natolia. It measures, alt. 15½–20½, lat. 4–4½ mm.

F. major, m. *Typo major robustiorque, anfr. tertio usque ad sextum distantius costulato-striatis, crista cervicis exteriore magis geniculata, minus rugosa. Alt.* 22, *lat.* 5 *mm.; alt. apert.* 5, *lat. apert.* 4 *mm.*

Hab. Arsa, valley near Xanthus, Lycia (*Spratt*).

Var. EVANIDA, mihi.

Typo multo minor, claviformis, anfr. 10, *ultimo minus valide bicristato. Apert. multo minor, peristomate subappresso, vix expanso, haud reflexo. Lamellæ plicæque minus validæ; loco parietalis superioris obsoletæ antice solum tuberculum album adest. Alt.* $14\frac{3}{4}$, *lat.* $3\frac{1}{2}$ *mm.; alt. apert.* 3, *lat. apert.* $2\frac{1}{3}$ *mm.*

Hab. Asia Minor, without exact indication of habitat (my collection).

Quasi a weakling, and easily to be distinguished from the type by the characters mentioned.

14. CLAUSILIA BREVICOLLIS, Pfr. Zeitschr. f. Malak. 1849 p. 107.

Var. CASIA, mihi.

Typo gracilior, albido-grisea, punctis strigisque obscuris adspersa, anfr. paullulum convexioribus, densestriatis nec costulatis. Apert. angustius rhomboideo-oblonga. Alt. $14\frac{1}{2}$, *lat.* $3\frac{1}{4}$ *mm.; alt. apert.* 3, *lat. apert.* $2\frac{1}{4}$ *mm.*

Hab. Island of Kasso (*Spratt*).

Whilst the typical costulated *C. brevicollis* is till now only known from the island of Rhodes, this striated variety inhabits the island of Kasso. It is very probable that one will find this species also in a connecting form in the intermediate island of Karpatho.

15. CLAUSILIA ASTROPALIA, n. sp. (Plate XXXIII. fig. 5.).

Aff. C. cæruleæ, *Fér., pusillæ, sed obscure cæsia vel cinerea nec læte lactea, cristis vel crista cervicis obsoleta.—T. parva, profunde arcuato-rimata, regulariter fusiformis, gracilis, tenera, oleo nitens, obscure cæsia vel cinerea subunicolor, apice nigra. Anfr.* $10\frac{1}{2}$–11 *convexiusculi, sutura distincta submarginata disjuncti, vix striatuli, fere læves, ultimus antice striato-costulatus, basi obsoletissime bicristatus, cristis brevibus, indistinctis, perapproximatis vel confluentibus, purum validius costulatis. Apert. parva, oblongo-ovata, intus obscure hepatica; perist. solutum. Cæterum* C. cæruleæ, *Fér., simillima. Alt.* $13\frac{1}{2}$–$15\frac{1}{2}$, *lat.* 3–$3\frac{1}{2}$ *mm.; alt. apert.* 3–$3\frac{1}{2}$, *lat. apert.* $2\frac{1}{4}$–$2\frac{1}{2}$ *mm.*

Hab. Island of Astropalia (*Spratt*).

A fine new species of the *cærulea* group, but smaller than *C. cærulea*, Fér., and *C. anaphiensis*, Bttg., of an obscure yellowish-grey colour, and with nearly obliterated neck-crests, which are still more feeble than in *C. maculata*, Rssm.

16. CLAUSILIA MILLERI, Pfr. P. Z. S. 1849, p. 136.

Island of Rhodes (*Spratt*), in the typical form and in a second form with more glabrate median whorls; but still more allied to *C. milleri*, P., than to *C. cærulea*, Fér. One only knew this species (or subspecies) till now from the island of Paros (*Miller*).

17. CLAUSILIA CÆRULEA, Fér. Prodr. 520.

Now I know this interesting and variable shell with absolute certainty from the following Greek islands:—Tino, Syra (here in a greater and in a smaller form), Mykono (*Thiesse*), Nikaria (*Thiesse*), Antiparo, Paro (*Thiesse*), Naxia (*Thiesse*, here also in a greater and in a smaller form), Nio, Amurgo, and Santorin. Not quite sure as to the island of Eubœa (f. *eubœica*, Mousson); still dubious as to the islands of Sipheno and Chios, and very uncertain as to Cyprus.

I can, however, now add to these localities the island of Crete as another habitat, where it is said to occur in the following characteristic variety.

Var. CRETENSIS, Pfr. Mon. Hel. ii. 1848, p. 115 (species; non *Claus. cretensis*, Rossm.),

T. aff. var. minori, *P.*, *cristis basalibus sulco levissimo separatis, superiore fere obsoleta. Lam. supera subnulla, spiralis, recedens, infera, ut videtur, minus valida. Alt.* 16, *lat.* 3½ *mm.*

Hab. Island of Crete (*Spratt*), but without exact indication of habitat.

18. CLAUSILIA KREGLINGERI, P. Malak. Blätter, xiii. 1866, p. 148.

This species does not inhabit the island of Santa Maura, as Dr. Pfeiffer says, but the north of the island of Eubœa (*Thiesse*).

19. CLAUSILIA SCULPTICOLLIS, n. sp. (Plate XXXIII. fig. 6.)

Intermedia inter C. moreletianam, *Blanc, et* C. corrugatæ. *Drap.*, *var.* draparnaudi, *Beck*, *sed apice subconcolori sculpturaque cervicis valde diversa.—Differt a* C. corrugata, draparnaudi, *Beck.*, *minore, minus ventriosa, apice clarius corneo, anfr.* 12, *præsertim junioribus, magis convexis ibidemque sutura crenulata disjunctis, ultimo conico, a latere valde compresso, distincte bicristato, cristis longis, arcuatis, exteriore altiore, plicis validissimis exasperata. Apert. multo angustior, magis oblonga; lam. infera subbifurcata; perist. minus late expansum. Cæterum forma, sculptura, colore simillima. Alt.* 19, *lat.* 4½ *mm.; alt. apert.* 4¾, *lat. apert.* 3½ *mm.*

Hab. Sofrana Islands, north of East Crete (*Spratt*).

This fine shell connects the group of *C. corrugata*, Drap., with which it agrees in all parts, save the form and the sculpture of the neck, with that of *C. cærulea*, Fér.,—wherein *C. anaphiensis*, Bttg., shows a remarkable analogy in the figure and position of the two crests on the neck. I regard as a good local variety the following,

Var. UNIA, mihi. (Plate XXXIII. fig. 7.)

Differt a typo t. multo graciliore, clavato-fusiformi, cæsia vel sordide alba, punctis strigisque fuscis adspersa, nec cæruleo-alba unicolori; spira valde attenuata; apice submamillato, omnino testæ concolori. Anfr. infraapicales, præterea ultimus sæpeque penultimus distinctius costulati, costis cervicis uti in typo sursum alternantibus vel bifidis, tum multifidis usque ad suturam ascendentibus. Apert. apparatusque claustralis *typo simillima, sed lam. supera brevissima, perist. minus expanso discrepans. Alt.* $17\frac{1}{2}$–18, *lat.* $3\frac{1}{2}$–$3\frac{3}{4}$ *mm.: alt. apert.* 4, *lat. apert.* 3 *mm.*

Hab. Unia Islands, north of East Crete (*Spratt*).

The form of the neck and the apparatus claustralis being nearly identical, this shell must be considered a local variety of *C. sculpticollis,* though its colour and habitus are indeed very different from those of the shell inhabiting the neighbouring Sofrana Islands.

20. Clausilia heracleensis, n. sp. (Plate XXXIII. fig. 8.)

T. breviter rimata, fusiformis vel turrito-fusiformis, tenera, nitida, lactea, hic illic griseo-strigata; spira magis minusve elongata; apex corneus. Anfr. $11\frac{1}{2}$–12 *convexiusculi, sutura simplici disjuncti, fere læves, sed striis spiralibus necnon transversis obliquis obsoletissimis quasi malleolati; ultimus deorsum angustatus, a latere compressus, bicristatus, cristis longissimis sed parum validis, parallelis, exteriore distinctiore, ante aperturam paucirugatus, rugis solum* 4–6 *distantibus, parum validis, sursum evanidis, sed acutiusculis. Apert. parva, ovato-oblonga, faucibus fuscis, perist. parum expanso, albo; lamellæ subæquales, supera spiralem fere attingens, infera semilunaris oblique ascendens, intus subfurcata, subcolumellaris et oblique intuenti non conspicua; lunella valde arcuata, subdorsalis. Alt.* 18–$20\frac{1}{2}$, *lat.* 4 *mm.; alt. apert.* $3\frac{3}{4}$, *lat. apert.* $2\frac{3}{4}$ *mm.*

Hab. Near Kandia (town), island of Crete (*Spratt*).

One of the Admiral's most interesting species, and without close relation to any other known *Albinaria.* The neck-crests being analogous in form to those of *C. sculpticollis,* I think best to rank it here next to that species. But the habit also approaches somewhat that of *C. olivieri,* Roth; and so the new shell seems to connect the *olivieri* with the *cærulea* group. Accordingly I prefer to place it in a group by itself in the vicinity of the *cærulea* group.

21. Clausilia manselli, n. sp. (Plate XXXIII. fig. 9.)

Statura magnitudineque C. extensæ, *P., et* C. distantis, *P., colore, sculptura spiræ, forma aperturæ* C. claræ, *Bttg., sculptura cervicis* C. extensæ, *P. Valde aff.* C. claræ, *Bttg., sed turrito-fusiformis; anfr.* 12–13, *sutura haud marginata, sed costis transgredientibus distincte crenata disjuncti, costis æquidistantibus, subalternantibus,* 11–12 *in singulis anfractibus ornati; ultimus æque costatus ac penultimus, costis* 11–12 *non validioribus, sursum prope aperturam bifidis. Forma aperturæ late ovalis apparatusque claustralis* C. claræ, *Bttg. Alt. ca.* $22\frac{1}{2}$, *lat.* $4\frac{1}{2}$ *mm.; alt. apert.* $4\frac{1}{2}$, *lat. apert.* $3\frac{1}{3}$ *mm.*

Hab. Kavallos Islands, east of Crete (*Spratt*).

This species, which I name in honour of Rear-Admiral Arthur Lucis Mansell, who for many years served in the Levant under Vice-Admiral Spratt (see Spratt's 'Travels and Researches in Crete') and now resides at Chalkis, is nearly allied to *C. clara,* Bttg., from the Bay of Mirabello; but the ribs of its shell are nearly equidistant and alternating, whilst in *C. clara*, of which the habitus is shorter and more ventricose, the intervals between the ribs enlarge steadily from apex to aperture. The same character as in the new species is to be seen in *C. distans*, P., from Soudsouro Bay; but here the costulation is finer (17 ribs on each whorl), and the inferior lamella is distinctly bifurcate.

22. Clausilia clara, Bttg. Mon. Claus.-Sect. *Albinaria*, p. 70, t. 3. fig. 1.

Var. multicosta, mihi.

Differt a typo t. majore, ventricosiore, spira magis concave producta; anfr. 12–12½, *costis spiræ minus validis duploque pluribus* (23–26 *in anfr. penultimo*), *minus spatiosis ornati. Apert. latior, rotundato-ovata, perist. magis expanso. Cæterum et præcipue costis cervicis simillima. Alt.* 18½–20, *lat.* 4½–4¾ *mm.; alt. apert.* 4½, *lat. apert.* 3¾ *mm.*

Hab. Mirabello, N.E. of Crete (*Spratt*).

A larger variety, with one whorl more, well characterized by the more finely costulated upper whorls.

Var. paucicosta, mihi.

Colore sculpturaque fere intermedia inter C. præclaram, *P., et* C. claram, *Bttg., sed huic multo magis affinis. Differt a typo t. fere subfusco-grisea, costis anfr. omnium minus numerosis* (*in anfr. ultimo* 7, *in penultimo* 10, *in antepenultimo* 9 *etc.*). *Lam. supera minor, fere punctiformis. Alt. ca.* 18½, *lat.* 4¼ *mm.; alt. apert.* 4, *lat. apert.* 3 *mm.*

Hab. St. Nikolo Island, Gulf of Mirabella, Crete (*Spratt*).

Whilst var. *multicosta* has a much denser costulation in the median whorls, this variety is nearly as widely costulated as *C. præclara*, P. But the latter species shows 6 ribs in the last whorl, ours 7, and 6 and 6, ours 10 and 9, ribs in the penultimate and antepenultimate whorls.

23. Clausilia præclara, Pfr. Zeitschr. f. Malakoz. 1853, p. 150.

F. major, m. *T. typo major, clarius isabellino-albida, costis in anfr. ultimo* 7, *in anfr. penultimo* 9, *in anfr. antepenultimo* 8 *ornata. Apert. multo major, lam. supera longa. Alt. ca.* 21½, *lat.* 6 *mm.; alt. apert.* 5, *lat. apert.* 4 *mm.*

Hab. The south-east of Crete (*Spratt*).

The type, of smaller size and aperture and showing fewer ribs on the whorls, lives near the shores of the Gulf of Mirabella. *C. præclara*, P., the crown of the palæarctic *Clausiliæ*, is easily distinguished from *C. clara*, Bttg., by its fewer and constantly curved and convex ribs.

24. Clausilia vermiculata, n. sp. (Plate XXXIII. fig. 10.)

Habitu sculpturaque spiræ C. vesti, *mihi, similis, sed sculptura cervicis, forma aperturæ, apparatu claustrali* C. retusæ, *Oliv.*, *propior.—T. vix rimata, subclavato-fusiformis, opaca, calcareo-alba, in interstitiis costularum hic illic cinerea, apice nigra. Anfr. ca.* 12 *vix convexiusculi, sutura lævi crenata disjuncti, dense valideque undulato-costulati, costulis sæpe sursum bifidis, interstitiis verticaliter substriatis; ultimus parum attenuatus, vix validius et æque ac cæteri costulatus, costulis ad suturam plerumque bifidis, basi distincte anguste sulcatus, obsolete bicristatus, crista inferiore distinctiore striis densis ornata. Apert. ampla, late oblonga, basi valde recedens, intus fusco-castanea, perist. albo. Apparatus claustralis lamellæque valde aff.* C. tereti, *Oliv., lunella obsoleta, apice clausilii corrotundato. Alt. ca.* 21, *lat.* 4¼ *mm.; alt. apert.* 4½, *lat. apert.* 3¼ *mm.*

Hab. Zakro?, east of Crete (*Spratt*).

One of the most difficult forms of the island of Crete. It looks nearly like certain forms of *C. corrugata*, Drap., var. *inflata*, Oliv., from Candia; but the shape of the neck, the receding base of the mouth, and the deep brown colour of its interior shows that we must search for its allies amongst *C. teres*, Oliv., and *C. retusa*, Oliv. The form of the neck and also the mouth and the apparatus claustralis being very analogous to those of *C. retusa*, I think it best to place it between this species and *C. vesti* of the *olivieri-teres* group.

25. **CLAUSILIA VESTI**, n. sp. (Plate XXXIV. fig. 11.)

Quasi intermedia inter C. corrugatum, *Drap., f.* epimenides, *Blanc, et* C. teretem, *Oliv., sed huic magis affinis.—Differt a* C. tereti, *Oliv., t. tota valide costulata. Anfr.* 15 *planissimi, sutura submarginata disjuncti, exceptis apicalibus costulati, costulis validis, rectis, strictis* (30 *in anfr. penultimo*), *interstitiis spiraliter substriatis; ultimus distantius validiusque costulatus, costulis pp.* 20, *ante aperturam altioribus, undulatis, sursum hic illic dichotomis, basi parum distincte breviter subbicristatus, crista umbilicali pliculis sat validis crenata. Apert.* C. teretis, *Oliv., sed lam. supera longa nec punctiformis, infera minus distincte bifurcata. Cæterum huic speciei simillima. Alt.* 27½, *lat.* 4½ *mm.; alt. apert.* 5½, *lat. apert.* 3⅔ *mm.*

Hab. Sitia Bay, N.E. of Crete (*Spratt*).

This fine form, which I name in honour of Herr von Vest of Hermannstadt, Transylvania, author of an important and very interesting paper on the classification of this genus, is perhaps only a variety of *C. teres*, Oliv.; but because intermediate stages of sculpture are wanting between these two shells, and differences also exist in the form of the neck and of the lamellæ, I have thought it better to create a new species for it. *C. corrugata*, Drap., var. *inflata*, Oliv., in its beautiful large local form *epimenides*, Blanc, which inhabits the Spinalunga peninsula, is, on the other hand, a nearly allied shell; but its ventricose form, the different costulation of the neck, the largeness and different position of the inferior lamella, and the absence of the small superior palatal plait will easily distinguish the two species.

Var. SUTURALIS, m.

Differt a typo t. minore, magis ventriosa, gilvo-alba, anfr. 13½, *sutura distincte marginata disjunctis, costulis spiræ densioribus* (40 *in anfr. penultimo*), *magis undulatis et hic illic sursum dichotomis, lam. infera majore distinctiusque bifurcata, faucibus clarioribus, fuscescentibus nec læte castaneis. Alt.* 24, *lat.* 4½ *mm.; alt. apert.* 5¼, *lat. apert.* 3¾ *mm.*

Hab. Sitia peninsula, N.E. of Crete (*Spratt*).

This variety agrees more nearly with *C. corrugata* f. *epimenides*, Blanc, than the type, but is easily distinguished from it by the denser and more acute costulation, the yellowish-white colour, the form of the neck, and the distinctly bifurcate inferior lamella.

26. CLAUSILIA TERES (Olivier), Voyage, i. p. 417, tab. 17. fig. 6.

The type of this fine species was found by Admiral Spratt near Cape Sidaro, and at Yani Khan in the N.E. of Crete.

F. PHALANGA, mihi. *Differt a typo t. majore, multo magis cylindrata, anfr.* 16, *mediis* 8 *fere lævibus, vix substriatis, sed obsolete spiraliter lineatis. Alt.* 28, *lat.* 4¼ *mm.; alt. apert.* 5, *lat. apert.* 3¼ *mm.*

Hab. The north-east of Crete (*Spratt*), without distinct indication of locality.

Var. INSULARIS, m.

A C. tereti (*Oliv.*) *typica discrepans t. minore, ventrioso-fusiformi, spira multo minus elongata. Anfr.* 13–14, *medii obsolete ruguloso-costulati; ultimus costulis validioribus, sursum plerumque multifidis exasperatus, lamellis aperturæ validioribus, supera longiore, infera magis protracta, sigmoidea ascendente, intus vix bifurcata. Alt.* 20½, *lat.* 4½ *mm.; alt. apert.* 4½, *lat. apert.* 3 mm.

Hab. Island of Kophino, E. of Crete (*Spratt*).

This form seems to be a local variety of *C. teres* (Oliv.), but is remarkably shorter, more ventricose, with stronger and more oblique ribs on the neck, and with distinctly more developed lamellæ. The neck and the form and position of the lamellæ are also quite similar to those of *C. olivieri*, Roth; but the white and not at all brown peristome, and the milk-white, not spotted, colour of the shell, are foreign to the Rhodian species and agree better with *C. teres* (Ol.).

27. CLAUSILIA CARPATHIA, n. sp. (Plate XXXIV. fig. 12.)

Aff. C. olivieri, *Roth, sed calcareo-alba, anfr.* 12½, *sutura profundiore disjunctis, acute costulatis, perist. albo.—T. fusiformiturrita, opaca, calcarea, hic illic leviter griseo adspersa; spira elongata turrita; apex corneus. Anfr. convexiusculi, sutura sat profunda, subcrenulata disjuncti, valide costulati, costulis* (30 *in anfr. penultimo*) *acutis, substrictis, in anfr. ultimo parum validioribus nec crebrioribus. Apert. ovato-oblonga, lam. spirali* *inferaque magis recedentibus, faucibus fuscescentibus, perist. albo, sublabiato. Cæterum* C. olivieri, *Roth, simillima. Alt.* 21, *lat.* 4 *mm.; alt. apert.* 4¼, *lat. apert.* 3 *mm.*

Hab. Island of Karpatho (*Spratt*).

Next to *C. olivieri*, Roth, from the island of Rhodes, with nearly the same form and costulation of neck, but with acuter and stronger ribs on the shell than even in *C. turrita*, P.

28. Clausilia privigna, n. sp. (Plate XXXIV. fig. 13.)

Peraff. C. carpathiæ, *mihi, sed minor, clavato-fusiformis, subventriosa, fusco-isabellina, albido-costulata, apice concolori. Anfr.* 12 *perconvexi, humiles, lentius accrescentes, costis crebrioribus* (38 *in anfr. penultimo*), *rudioribus, fere lamelliformibus, valde arcuatis, sursum sæpe dichotomis ornati, ultimus multo humilior, basi rotundatus. Apert. minor, rotundato-ovata, lam. infera minus recedente, faucibus obscure castaneis, perist. parum expanso, vix reflexo. Cæterum* C. carpathiæ *simillima. Alt.* 17½, *lat.* 4 *mm.; alt. apert.* 3⅔, *lat. apert.* 2¾ *mm.*

Hab. Sofrana Islands (*Spratt*).

This species is indeed closely allied to the preceding and surely related by blood; but its habitus is always quite different, and it would be unscientific to place both in the same species. The shell from the Sofrana Islands has constantly a more round, *C. carpathia* a more oblong cross section of their whorls. Also *C. saxatilis*, P., from Cyprus is an allied shell, but distinctly to be distinguished by its less convex whorls and much deeper-lying apparatus claustralis.

29. Clausilia turrita, Pfr. P. Z. S. 1849, p. 135.

Admiral Spratt found this species, which was till now only known from the islands of Milo, Sipheno, and Amorgo, also in the island of Andro. Here it is more slender than my var. *syphnia*, from Sipheno, but in other respects there seems to exist no difference.

30. Clausilia unicolor, Bttg. Mon. Claus.-Sect. *Albinaria*, p. 80, tab. 3. fig. 3.

This interesting species, of which the native country was not known, has been discovered by Admiral Spratt in the islands of Karpatho and Saria (N. of Karpatho). Specimens from Karpatho measure—alt. 16–17½, lat. 3½–4 mm., alt. apert. 3½–3¾, lat. apert. 2¾–3 mm.; those from Saria—alt. 17–19, lat. 3¾ mm., alt. apert. 3½, lat. apert. 3 mm.

31. Clausilia eburnea, Pfr. P. Z. S. 1854, p. 296.

The type of this species, inhabiting the White Mountains, island of Crete (*Spratt*), though in its exterior very similar to *C. glabricollis*, P., from Akarnania, seems to be more allied to *C. ungeri*, Zel., and *C. virgo*, Mouss., both from Cyprus and both belonging to the *munda*, than to the *scopulosa* group, inhabiting exclusively Morea and the adjacent islands.

32. CLAUSILIA GLABRICOLLIS, Pfr. Malakoz. Blätter, xiii. 1866, p. 147.

Of this species, whose type inhabits Akarnania, Consul A. Letourneux has recently found a smaller variety near Kerassovo in Ætolia (Consul Nik. Konéménos). Alt. $15\frac{1}{2}$, lat. $3\frac{1}{2}$ mm.; alt. apert. $3\frac{1}{2}$, lat. apert. $2\frac{3}{4}$ mm.

33. CLAUSILIA CONEMENOSI, n. sp. (Plate XXXIV. fig. 14.)

T. intermedia inter C. cyclothyram, *Bttg., et* C. hiantem, *Bttg., sed fere perforato-rimata, calcareo-alba, anfr. non lævibus sed valide et distantius costulatis quam iis* C. hiantis, *costulis perobliquis, valde arcuatis, in anfr. ultimo non validioribus, imo fere densioribus, crista basali validiore, compressa, arcuata, sursum sulco tenui circumscripta. Apert. rotundato-ovata, faucibus albidis concoloribus vel flavescentibus, palatali supera distincta. Alt.* 12–$14\frac{1}{2}$, *lat.* $2\frac{3}{4}$–3 *mm.; alt. apert.* $2\frac{3}{4}$, *lat. apert.* $2\frac{1}{4}$ *mm.*

Hab. Perivola, Bezaïti and Mount Amblo near Patras, Morea (*Konéménos*).

This little species, to which I give the name of its discoverer, my friend the Turkish Consul Nikolaus Konéménos at Patras, is easily distinguished from *C. cyclothyra*, Bttg., by its calcareous and not milk-blue colour, by the light yellowish, and not bright brown, interior of the mouth, and by its costulated median whorls. From *C. hians*, Bttg., it may be discerned by the less grey colour, by the more costulated and not striated shell, by the longer spiral lamella, the longer and very distinct principal plait, and by the presence of a distinct superior palatal plait.

34. CLAUSILIA HIANS, Bttg. Mon. Claus.-Sect. *Albinaria*, p. 87, tab. 3. fig. 5.

Var. SUBLACTEA, m.

Differt a typo t. fere lactea, striis vel costulis spiræ vel minus acutis vel subobsoletis, palatali supera interdum punctiformi. Alt. $14\frac{1}{2}$, *lat.* 3 *mm.; alt. apert.* 3, *lat. apert.* $2\frac{1}{2}$ *mm.*

Hab. Ætolia (*Konéménos*).

This variety cannot be confounded with *C. conemenosi*, mihi, because it shows the fine striation and the incomplete apparatus claustralis of the true *C. hians*, Bttg., from Akarnania.

35. CLAUSILIA DISCOLOR, Pfr. Symbol. iii. p. 93.

Has been sent to me by Miss Joséphine Thiesse, of Chalkis, in the var. *inæqualis*, Blanc, also from the Gythion Mountains next Marathonisi in Lakonia.

36. CLAUSILIA GRAYANA, Pfr. Symbol. iii. p. 94.

This shell has been discovered at the island of Servi (Elaphonisi) by Admiral Spratt in a f. *gracilior*, mihi, which has a more finely striated shell, the interior of the aperture yellowish and not brown, and only alt. $14\frac{1}{2}$, lat. $3\frac{1}{4}$ mm.; alt. apert. $3\frac{1}{4}$, lat. apert. $2\frac{1}{4}$ mm.

37. CLAUSILIA GOLDFUSSI, n. sp. (Plate XXXIV. fig. 15.)

T. magna, fere perforato-rimata, clavato-fusiformis, ventriosa, lactea, hic illic cinereo-punctata, nitida; spira turrita; apex corneus. Anfr. 11½–12 *convexiusculi, sutura distincta disjuncti, læves, ultimus penultimo vix altior, basi bene rotundatus, sulco levissimo obsoletissime bigibbus, prope aperturam dense costulato-striatus. Apert. parva, rotundato-ovata, faucibus luteis; perist. continuum, brevissime solutum, fere non expansum, simplex. Lam. supera fere deficiens, in nodulis* 2 *continuis parum validis constituta, spiralis, recedens; infera profunda, alta, semilunaris, subbifurcata, ascendens; subcolumellaris valida, oblique intuenti conspicua; plica principalis brevissima, altissima, remota a sutura; lunella dorsalis, valde arcuata. Clausilium angustum, apice acutissimo instructum. Alt.* 22½–23, *lat.* 5¼–6 *mm.; alt. apert.* 4½–5, *lat. apert.* 3¾–4 *mm.*

Hab. Mountains of Taygetos, Sparta (*Dr. Theod. Krueper*).

This great and remarkable shell, which my friend Herr O. Goldfuss, at Halle-Saale, has presented to me, seems to be isolated amongst all the other known *Albinariæ* of the Morea. It unites the habit and colour of the little *C. incrustata*, mihi, with the mouth of *C. arcadica*, mihi, and the inferior lamella of *C. messenica*, v. Mts., with the form and sculpture of the neck of *C. contaminata*, Rossm. It forms, as I believe, a special group intermediate between the *voithi* and the *maculosa* groups, and is especially characterized by its not quite perfect apparatus claustralis.

38. CLAUSILIA KRUEPERI, Pfr. Malakoz. Blätter. xiii. 1866, p. 152.

This species, to which I now attach as a variety my *C. dissipata* (Mon. Claus.-Sect. *Albinaria*, 1878, p. 99, tab. 3. fig. 6)=*C. furcilla*, Westerlund (Aperçu s. l. Faune Malac. d. l. Grèce, Naples 1879, p. 113), has a much wider geographical distribution than one could anticipate a few years ago. We now know this var. *dissipata*, Bttg., from Mesolongi, Mount Varassova and Epakto in Roumelia, and from Mount Elias and Gerakomio, near Patras, in the Morea. The following new variety seems to inhabit more the south of the Nomen (province) of Ilia.

Var. HOLOSTOMA, m.

A typo discrepans t. magis albida, spira hic illic distinctius corneo vel grisco strigata, anfr. mediis plerumque densius distinctiusque striatis, perist. continuo, paullulum soluto. Alt. 12½–13½, *lat.* 3½ *mm.; alt. apert.* 3½, *lat. apert. fere* 3 *mm.*

Hab. Cape Katakolo, S. of Ilia, Morea (*Thiesse*).

This distinct variety may easily be distinguished both from the type and from the var. *dissipata*, Bttg., by its whitish colour and by a peristome not only continuous but often even distinctly protracted.

39. Clausilia arcadica, Bttg., Mon. Claus.-Sect. *Albinaria*, p. 101, tab. 3. fig. 7 (*maculosa*, subsp. *arcadica*, Bttg., olim).

For this fine-coloured shell I can now add the localities Mamoussá near Vostitsa (*Consul Nik. Koneménos*), Megaspiléo near Kalavryta (*Koneménos*), both localities in the north of the Morea, and Mount Cylline, Sparta (*Thiesse*). Having in my hands more copious material than during the publication of my dissertation on the section *Albinaria*, I can now with more certainty give my opinion on the specific value of this form. The diagnosis of this species may be:—

Discrepans a C. maculosa, *Desh., typica t. majore, graciliore, tenuiore, strigis corneo-fuscis distinctioribus variegata, spira longe attenuata. Anfr.* 11–$12\frac{1}{2}$, *planiores, ultimus basi distinctius gibbosa, obsolete sulcatus, ante aperturam validius costulato-striatus. Apert. minor, regulariter ovata ; perist. parum expansum, vix aut non labiatum. Lam. supera vel parva vel obsoleta, recedens ; subcolumellaris oblique intuenti aut vix aut non conspicua ; lunella deorsum sæpe obsoleta. Alt.* $16\frac{1}{2}$–$20\frac{1}{2}$, *lat.* $3\frac{1}{2}$–5 *mm.; alt. apert.* $3\frac{1}{2}$–$4\frac{1}{2}$, *lat. apert.* $2\frac{3}{4}$–$3\frac{1}{4}$ *mm.*

Hab. Interior of North and Central Morea.

40. Clausilia schuchi, Rssm., see Boettger, Mon. Claus.-Sect. *Albinaria*, p. 102.

Var. oscarii, Thiesse, MS. (Plate XXXIV. fig. 16.)

Differt a typo t. maxima, valde ventriosa, lactea unicolor, vel raro-strigillata vel punctata, anfr. 11–12, *mediis fere semper lævibus, perist. magis expanso. Alt.* 19–$19\frac{1}{2}$, *lat.* $4\frac{3}{4}$–$5\frac{1}{2}$ *mm.; alt. apert.* $4\frac{1}{2}$, *lat. apert.* 4 *mm.*

Hab. Vitylo and Mount Cylline, Sparta (*Thiesse*).

This curious form cannot be separated from the little brown-striped typical *C. schuchi*, Rssm., of Navarino, although it has a very peculiar aspect by its great size, uniform colour, and ventricosity; but the plaits and lamellæ of the mouth and the apparatus claustralis are absolutely identical in both forms.

41. Clausilia incrustata, n. sp. (Plate XXXIV. fig. 17.)

Peraff. C. contaminatæ, *Rssm., var.* solutæ, *Mouss., sed sub epidermide lactea fusca ; anfr. ultimus gibbere umbilicali distinctiore, magis compresso instructus, prope aperturam subconstrictus ; apert. minor, angustior, sub sinulo magis compressa ; perist. breviter expansum, acutum, calloso-labiatum ; lam. supera longissima, acuta ; infera multo altior, semilunaris, subcolumellaris, oblique intuenti non conspicua. Alt.* $15\frac{1}{2}$–16, *lat.* 4–5 *mm. ; alt. apert.* $3\frac{3}{4}$, *lat. apert.* 3–$3\frac{1}{4}$ *mm.*

Hab. Island of Servi or Elaphonisi (*Spratt*).

This very peculiar shell is distinguished from *C. contaminata*, Rssm., by its high and long lamella supera, by its very strong lamella infera, and by the totally concealed lamella subcolumellaris.

Sect. *Papillifera*, ex rec. Bttg.

42. **Clausilia abyssoclista**, n. sp. (Plate XXXIV. fig. 18.)

Aff. C. bathyclista, *Blanc, sed gracilior, anfr.* 11 *dense striatis nec fere lævibus, plica principali suturæ valde approximata, longissima, ventrali, lunellam rectam strictamque brevem, latam,* I-*formem, subventralem intus valde transgrediente. Pl. palatales nullæ. Perist. albo- nec fusculo-labiatum. Alt.* $15\frac{1}{2}$–17, *lat.* $3\frac{1}{2}$–4 *mm.; alt. apert.* 4, *lat. apert.* $3\frac{1}{4}$ *mm.*

Hab. Epidaurus, Morea (*Spratt*), together with *C. maculosa*, Desh.

A very distinct species of the *bathyclista* group (Jahrb. d. deutsch. malak. Gesellsch. 1879, p. 122, tab. 3. fig. 14), easily to be distinguished by the deep ventral lunella and by the absence of the two long palatal plaits.

43. **Clausilia campylauchen**, n. sp. (Plate XXXIV. fig. 19.)

Aff. C. osculanti, *v. Mts., nec non* C. blanci, var. thebanæ, *v. Mts., sed albida, undique corneo strigata, apice obscura. Habitu* C. thebanæ; *anfr.* $8\frac{1}{2}$–9, *sutura marginata disjuncti, medii obsoletius densiusque striati, ultimus a latere valde compressus, cristis validioribus sulco brevi profundo separatis armatus, crista exteriore valde elevata geniculatimque erecta. Apert. rotunda, ad sinulum parum acutata; perist. protractum, satis expansum, sed subsimplex, non aut vix labiatum. Apparatus claustralis similis ei* C. thebanæ, *sed lam. parallela distinctissima, intus altissima; supera breviore; infera altiore, semiovata; pliculis suturalibus in callum album unicum punctiformem confusis; principali ante lunellam distincta, antice in callum noduliformem duplicem desinente. Alt.* 13–15, *lat.* $3\frac{1}{2}$–$3\frac{3}{4}$ *mm.; alt. apert.* $3\frac{1}{2}$, *lat. apert.* $3\frac{1}{4}$ *mm.*

Hab. Monembasia, Lakonia (*Thiesse*).

This very interesting shell accords in colour with *C. maculosa*, Desh., and in its apparatus claustralis with *C. blanci*, var. *thebana*, v. Mts. The absence of the little sutural plaits is a highly characteristic difference from all its allies; and the higher lamella infera and the two white nodules in the palate are also good characters for this species.

C. campylauchen is the first form of the little group of *C. isabellina, osculans, coarctata,* and *blanci,* which has been found in the proper peninsula of Morea.

44. **Clausilia blanci**, v. Mts. Jahrb. d. deutsch. mal. Ges. 1876, p. 340, tab. 12. fig. 4.

Found by Admiral Spratt on Mount Stylida, N.W. extremity of Eubœa, at 1000 feet alt., and on Mount Ktypa in Bœotia.

45. **Clausilia confusa**, Bttg. Jahrb. d. deutsch. mal. Ges. 1878, p. 304, tab. 10. fig. 8.

This species, till now known only from the island of Cerigo, has also been found by Admiral Spratt in Servi Bay, Morea.

Sect. *Alinda*, ex rec. Bttg.

46. CLAUSILIA DENTICULATA (Olivier), Voyage, i. p. 297, tab. 17. fig. 19.

Var. SPRATTI, m.

Differt a typo t. magis turrita, isabellina, anfr. 14–15, *apert. magis protracta, sinulo distinctiore, elevato, labio sinistro peristomatis denticulis omnino carente. Alt.* 18½, *lat.* 3½ *mm.; alt. apert.* 3½, *lat. apert.* 2½ *mm.*

Hab. Island of Kos (*Spratt*).

This fine variety differs peculiarly from the type of the islands Andro and Tino by the complete absence of denticulation of the outer lip.

Sect. *Idyla*, v. Vest.

47. CLAUSILIA THESSALONICA, K., var. *euboica*, Bttg. Nachr.-Blatt. d. deutsch. malakozool. Ges. 1880, p. 50.

Admiral Spratt collected this variety, which was till now only noted from Hagia Anna in the north of Eubœa, on Mount Stoura, South Eubœa, in 2000 feet alt. Here the form has a more greenish-brown colour, an interrupted peristome, and alt. 14, lat. 3½ mm.

Now, in studying again my rich material of this group, I find that also *C. spreta*, K., from the Prinkipo Islands and from Brussa in Natolia, must be regarded as only a variety of *C. thessalonica*, K.

Sect. *Oligoptychia*, Bttg.

48. CLAUSILIA SOWERBYANA, Pfr. P. Z. S. 1849, p. 141.

This rare, always decollated species must be ranked in the section *Oligoptychia*, where it represents a peculiar little group (*Sprattia*) connecting the subsections *Armeniaca*, Bttg., with *Scrobifera*, Bttg., and being well characterized by the truncature of the apex and by the acutely striated shell. Admiral Spratt found this magnificent shell in Evder Khan near Adalia, Pamphylia.

49. CLAUSILIA EUSTROPHA, Bttg., 22. u. 23. Bericht d. Offenbacher Vereins f. Naturkunde, 1883, p. 210.

This species, only known till now from the island of Skyatho and from North Eubœa, has been collected in small but typical specimens by Admiral Spratt at the akropolis of Opus, Phthiotis. Alt. 13¼–14½, lat. 3 mm.

50. CLAUSILIA BICRISTATA, Rssm. Iconogr. ii. fig. 619.

Var. TETRAGONOSTOMA, P., Boettger in 22. u. 23. Ber. d. Offenb. Ver. p. 213.

Has been collected by Admiral Spratt on Mount Oktonia, south of Koumi, Eubœa, at 2000 feet alt., in a form of alt. 17½, lat. 3½ mm., alt. apert. 3⅔, lat. apert. 3 mm., which agrees well with f. *kumensis*, Bttg., but differs in having the same smooth median whorls as the typical form of *tetragonostoma*, P., from Mount Delphi.

A nearly typical f. *kumensis* has been sent me by Herr O. Goldfuss from Steni, Eubœa, which I think may be "Stoura" in south Eubœa. But it is a little smaller, pruinose, the shell thicker, the peristome less expanded. Alt. 15–17, lat. $3\frac{1}{2}$–$3\frac{3}{4}$ mm.; alt. apert. $3\frac{1}{2}$, lat. apert. 3 mm.

Closely allied to this is a second form of *kumensis* from the south extremity of Eubœa (*Spratt*). Its neck-crests form a clear transition from *C. bicristata* to *C. kephissiæ*, Roth; but I do not venture to unite these two species from only a single specimen.

Var. CANALICULATA, P., Boettger, *l. c.* p. 187.

Admiral Spratt collected this variety on Mount Dagri, north extremity of the Delphi mountains, at 2000 feet alt., which agrees very well with my f. *major* from Mount Delphi. Alt. $16\frac{1}{2}$, lat. 4 mm.; alt. apert. $3\frac{3}{4}$, lat. apert. $3\frac{1}{4}$ mm.

The little specimens from Mount Soukaro, north of Koumi, obtained by the Admiral at 2000–3000 alt., are almost smaller than the type from Mount Delphi; and the costulation of the neck seems to be more distant. Alt. 12–13, lat. $2\frac{3}{4}$–3 mm.; alt. apert. $2\frac{3}{4}$, lat. apert. $2\frac{1}{2}$ mm.

51. CLAUSILIA KEPHISSIÆ, Roth, Mal. Blätter, ii. p. 45, tab. 1. figs. 15–17.

Var. DEBILITATA, mihi.

Differt a C. kephissiæ, *Roth, typica t. multo minore, anfr. solum* 10, *periomphalo angustiore, cristis basalibus aliquantulum minus validioribus, interlamellari eplicata. Alt.* $14\frac{1}{2}$–15, *lat.* $3\frac{1}{4}$–$3\frac{1}{2}$ *mm.; alt. apert.* 3, *lat. apert.* $2\frac{3}{4}$ *mm.*

Hab. Mount Ktypa, Bœotia (*Spratt*).

This remarkable little variety forms by its feebler neck-crests a quasi passage to *C. bicolor*, P., from Andro island, but resembles *C. kephissiæ*, Roth, in colour, sculpture, and habitat. In my opinion, however, it is doubtless nearer to the species of the continent.

Var. PIKERMIANA, Roth, Boettger, *l. c.* p. 199.

It is curious to find this variety, only known till now from continental Attica, among the inhabitants of the island of Zea (Tzia), where Admiral Spratt picked it up. It is certainly identical with typical specimens of this variety from Pikermi, and also scarcely to be distinguished from specimens from Pan's Grotto near Marathon (*O. Goldfuss*). Alt. $16\frac{1}{2}$, lat. 4 mm.; alt. apert. $3\frac{1}{2}$, lat. apert. $2\frac{3}{4}$ mm.

52. CLAUSILIA ROTHI, P., Boettger, *l. c.* p. 204.

This species has been collected by Admiral Spratt in "typical" specimens on the island of Thermia; and now I believe that *C. rothi* does not inhabit Syra—a habitat I always considered doubtful (*l. c.* p. 206).

EXPLANATION OF THE PLATES.

Plate XXXIII.

Fig. 1. *Clausilia subvirginea*, p. 327.
2. —— *sublamellosa*, p. 327.
3. —— *aphrodite*, p. 329.
4. —— *thiesseæ*, p. 329.
5. —— *astropalia*, p. 330.
6. —— *sculpticollis*, p. 331.
7. —— ——, var. *unia*, p. 331.
8. —— *heracleensis*, p. 332.
9. —— *manselli*, p. 332.
10. —— *vermiculata*, p. 333.

Plate XXXIV.

Fig. 11. *Clausilia vesti*, p. 334.
12. —— *carpathia*, p. 335.
13. —— *privigna*, p. 336.
14. —— *conemenosi*, p. 337.
15. —— *goldfussi*, p. 338.
16. —— *schuchi*, var. *oscarii*, p. 339.
17. —— *incrustata*, p. 339.
18. —— *abyssoclista*, p. 340.
19. —— *campylauchen*, p. 340.

3. Report on a small Collection of Hymenoptera and Diptera from the Timor Laut Islands, formed by Mr. H. O. Forbes. By W. F. Kirby, Assistant in the Zoological Department, British Museum.

[Received April 16, 1883.]

The Timor Laut or Tenimber Islands are a small archipelago situated to the north of Australia, about halfway between the island of Timor and the Aru Islands. The largest island is Timor Laut; but the small collection before me, consisting of only five species of Hymenoptera (all new) and three of Diptera, was formed in two of the smaller islands, viz. Larat and Maroe. I will now proceed to describe the Hymenoptera and to notice the Diptera, merely remarking that they exhibit strong affinities to those of the surrounding groups of islands, as would naturally be anticipated beforehand. The specimens are numbered; and I have noted these numbers throughout.

HYMENOPTERA ACULEATA.

Apidæ.

Crocisa cæruleifrons, sp. n.

Long. corp. 5 lin.

Female. Black, face and orbits (very broadly above) blue; prothorax with a short stripe behind on each side above, and a very large spot on the sides; mesothorax with seven blue spots—two small ones on the front border, adjoining those on the prothorax, a longitudinal one between, then two slightly oval ones near the middle, and a large irregular spot behind on each side, projecting a branch forward within the very large black tegulæ; scutellum black, strongly excavated in the middle; abdomen with the first segment blue, a narrow longitudinal line, the greater part of the hind border, and a long transverse spot contiguous to it black; the remaining segments of the abdomen are black, with a wide blue stripe sloping slightly upwards on each side; legs black, all the tibiæ with a wide blue stripe on the outside; wings dark purplish brown. (2128, Maroe.)

Allied to *C. nitidula*, Fabr., a species common in Amboina, Australia, &c., but apparently distinct.

XYLOCOPA FORBESII, sp. n.

Long. corp. 10 lin.

Male. Thickly clothed above with olive-green pubescence, as in the male of *X. æstuans*, Linn., or of *X. bryorum*, Fabr.; antennæ black above and fulvous beneath, the hairs on the middle of the under surface of the body, especially towards the tip, those on the lower part of the face, and the very long hairs on the tarsi shading into fulvo-ferruginous; wings brownish hyaline, with a slight violet shade, and marked on all the cells along the hind margin with numerous black dots, as in the allied species; proboscis black, probably reddish within and at the base when extended. (1988, Larat.)

Female. Black, thickly clothed with black hairs, and very thickly and finely punctured, except on the middle of the mesothorax, which is smooth and shining, and has a short longitudinal furrow in front; head clothed with bright yellow pubescence, that on the face thinner and paler; wings with a bright green iridescence, purplish along the veins towards the base; apical half of the antennæ pale beneath; proboscis mostly reddish; under surface of body thickly punctured, but with some bare spaces along the middle line. (1958, Larat; 2019, Maroe.)

Closely allied to *X. coronata*, Smith, from Kaioa; but in the female of that species (which doubtless has a male similar to that of *X. forbesii*) the wings have a bright violet instead of a green iridescence.

VESPIDÆ.

POLISTES EXTRANEUS, sp. n.

Long. corp. 5 lin.

Female. Head and thorax bright chestnut; clypeus pentagonal, bright yellow; mandibles with a yellow mark on each side; antennæ dull yellow; the scape, second joint, and upper part of the third reddish; prothorax narrowly edged with yellow in front and behind; scutellum with a transverse yellow line; metathorax edged with yellow on the sides; abdomen with the first joint yellow, with a broad red stripe, bordered behind with black, extending for two thirds of its length above, second and third segments blackish brown, the third bordered with yellow behind, the fourth yellow bordered with blackish brown in front and behind, and the fifth and sixth dull reddish; wings brownish hyaline, with reddish-brown nervures, yellow stigma, and brown borders. (2025, Maroe.)

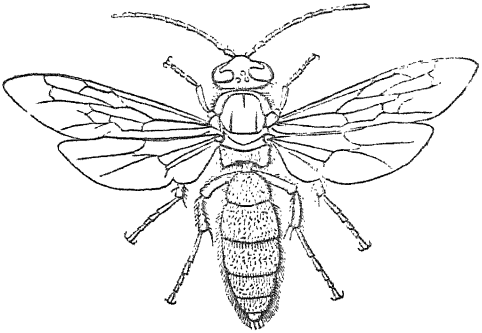
Closely allied to *P. stigma*, Fabr., from India, Ceram, and Celebes.

SCOLIIDÆ.

DIELIS LARATENSIS, sp. n.

Long. corp. 10½ lin.

Female. Black; sides of thorax and abdomen, and legs clothed with black hair; face black; clypeus very finely punctured above, and more coarsely on its lower edge, and bordered at the sides and below with yellow pubescence; mandibles pitchy; thorax and abdomen finely punctured, much more densely than elsewhere on the sides of the abdomen and on the four terminal segments, both above and below; thorax and abdomen with strong steel-blue reflexions, especially on the basal half of the abdomen above; wings deep violet-brown, second recurrent nervure incomplete, diverging from the first at the base and on the left wing; the nervule connecting the recurrent nervures above the middle is also obsolete. (1957, Larat).



Dielis laratensis.

Much resembles the Australian *Trielis anthracina*, Burm., in appearance.

CHRYSIDIDÆ.

CHRYSIS MELANOPS, sp. n.

Long. corp. 5 lin.

Male. Bright green, with a coppery reflection on the head and thorax (very bright coppery red wherever abraded); punctures large, close together, but not confluent; ocelli black, the space between and immediately around also blackish; apex of abdomen (and summit, when viewed sideways) with a strong blue reflection; under surface of antennæ, the greater part of the hind legs, and the tips and under surface of the middle tibiæ and middle tarsi brown; abdomen sexdentate, with equal and rather pointed teeth of moderate size; wings brown. (2049, Maroe.)

Probably allied to *C. parallela*, Brullé, from Timor; but that species is varied with blue on the head and thorax, instead of with copper.

DIPTERA.

The only Diptera in the collection were *Plecia fulvicollis*, Wied., and *Laphria gloriosa*, Walk., both of which are common species in the Eastern Archipelago, and a *Tabanus*, possibly new, but in too bad condition to describe.

June 5, 1883.

Osbert Salvin Esq., F.R.S., Vice-President, in the Chair.

The following report on the additions to the Society's Menagerie during the month of April 1883 was read by the Secretary:—

The total number of registered additions to the Society's Menagerie during the month of April 1883 was 65, of which one was by birth, 27 were by presentation, 26 by purchase, and 11 received on deposit. The total number of departures during the same period, by death and removals, was 92.

The most noticeable additions during the month were:—

1. A female Mule Deer (*Cervus microtis*), presented by Dr. J. D. Caton, C.M.Z.S., received April 6th.

The accession of this animal gives us two pairs of this fine Deer now living in the Society's Gardens. The present specimen was obtained in North-western Nebraska, and forwarded through the kind courtesy of Mr. W. A. Conklin, C.M.Z.S., of the Central Park Menagerie, New York.

2. A Great Black Cockatoo (*Microglossa aterrima*), purchased April 10th.

This individual seems to belong to the smaller and more greyish form of this species, which is sometimes called *M. alecto*; but it seems doubtful, according to the best authorities, whether the forms are really distinct.

3. A Bluish Shrew (*Crocidura cærulescens*), purchased April 19th.

The Insectivora are always hard to keep alive in captivity; but this little Shrew seems to have borne its voyage from India and to be likely to do well.

The Secretary also laid before the meeting a list of the species of Lepidopterous Insects which had emerged from pupæ in the Insect-House up to date, 23 in all; and called special attention to examples of *Sesia sphegiformis* and *Papilio cresphontes*, which had not been previously bred in the Society's Insect-House.

Living specimens of the so-called West-Indian Fire-fly (*Pyrophorus noctilucus*), lately presented by Mrs. Hall, were exhibited to the meeting.

Mr. Sclater laid before the meeting a selection from a collection of birds from New Britain, New Ireland, and the Solomon Islands that had been sent to him for examination by the Rev. George Brown, and called attention to some of the specimens, on which he made the following observations:—

Nasiterna pusio, Scl. P. Z. S. 1865, p. 127; Salvad. O. P. ii. p. 127.

Ten examples from Duke-of-York group and New Britain.

There is no doubt now of the true patria of this species, which is *not* from the Solomons, but from New Britain and the Duke-of-York group. The Solomon Islands representative is *N. finschi*, Ramsay, P. L. S. N. S. W. vi. p. 180, which, according to Canon Tristram (Ibis, 1882, p. 138), is very distinct.

Coriphilus subplacens (Scl.); Salvad. O. P. i. p. 310.

Examples of both sexes of this pretty species from the Fead group, east of New Ireland, a new locality for it.

Monarcha verticalis, Scl.; Salvad. O. P. ii. p. 25.

Examples of this fine species from Topaia, New Ireland, and the Duke-of-York group. The sexes are coloured alike.

Monarcha richardsi (Rams.); Salvad. O. P. iii. p. 529.

One example of this remarkable species from Rubiana, S. I.

Monarcha ugiensis (Rams.); Salvad. O. P. iii. p. 531.

Five examples from Ugi, S. I., all coloured alike. I quite agree with Count Salvadori, that *Monarcha* is the proper genus for this species.

Monarcha inornatus (Garn.); Salvad. O. P. ii. p. 14.

A single skin, apparently of this widely distributed species; from Fead Island, north of the Solomon group, due west of New Ireland. (Cf. Ramsay, Journ. Linn. Soc., Zool. xvi. p. 129.)

Graucalus monotonus, Tristram, Ibis, 1879, p. 441.

A skin apparently referable to this species; but in such case the describer has omitted to notice the conspicuous white edgings of the inner webs of the primaries.

Myzomela pulcherrima, Ramsay; Salvad. O. P. iii. p. 542.

Fourteen skins of this fine new species, from Ugi, S. I.

Calornis feadensis, Ramsay, Journ. Linn. Soc. xvi. p. 129.

A single skin of this newly described species, from Fead Island.

Ptilopus eugeniæ (Gould); Salvad. O. P. iii. p. 56; Tristram, Ibis, 1882, p. 139.

A single perfect adult specimen of this lovely species, from the Solomons, the exact island not marked.

The collection also contains numerous examples of *Ptilopus richardsi* and *P. solomonensis*, from Ugi, S. I. The latter species is closely allied to my *P. johannis* (Birds of the 'Challenger' Exp. pl. x.), but quite distinct.

Carpophaga melanochroa, Scl.; Salvad. *l. c.*

Two skins of this fine species, of which the type (described and figured, P. Z. S. 1878, p. 672, pl. xlii.), has hitherto remained unique. Both are from the Duke-of-York group, where Mr. Brown tells me the bird is very rarely seen.

Reinwardtœnas browni (Scl.); Salvad. O. P. iii. p. 131.

Six examples of this fine species, all alike, and from the Duke-of-York group.

I have great doubts whether Count Salvadori is correct in his suggestion that *Turacœna crassirostris* is the young of this species.

In continuation of previous communications on the same subject[1], Mr. Sclater exhibited two birds obtained near Lima, Peru, and transmitted to him by Prof. William Nation, C.M.Z.S. These were:—

(1) A fine adult specimen of BUTEO ABBREVIATUS (*Tachytriorchis abbreviatus*, Sharpe, Cat. Birds, i. p. 163) in the plumage of *Buteo albonotatus*, Gray, *i. e.* with occasional white spots on the lower surface.

This bird had been shot near the gates of Lima in September 1862. "Cere, legs, toes, and edges of the mouth of a beautiful chrome-yellow; bill bluish, tip nearly black. Food in stomach part of a lizard and remains of birds. Sex, male."

(2) A fine adult *male* of the Humming-bird *Polyonymus caroli*, of which Prof. Nation had previously sent a female (P. Z. S. 1881, p. 487).

Mr. Nation wrote of this specimen:—"It was shot by Mr. Dallas in his trip up the valley of the Rimac in 1880, and sent to me in the flesh. The place where he shot it is at about 8000 feet altitude. Sex, male. Total length $5\frac{5}{10}$ inches, wing $3\frac{4}{10}$; irides bluish black. Food found in the stomach, small coleopterous insects."

Mr. Sclater took this opportunity of remarking that his *Buarremon nationi*, described in the last paper on Mr. Nation's birds (P. Z. S. 1881, p. 485, pl. xlvi.), was undoubtedly identical with *Pipilo mystacalis* of Taczanowski (P. Z. S. 1874, p. 521), but that, as *mystacalis* had been already used by Lafresnaye as a specific term in the genus *Buarremon*, it would perhaps be better to use the name "*nationi*" for this species if it were to be retained in the genus *Buarremon*.

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[1] See P. Z. S. 1881, p. 484, for the last.

Mr. Sclater called the attention of the Meeting to a Condor from Peru, which had been presented to the Society by Mr. John I. North, on the 13th June, 1877, and which was still living in the Society's Gardens. After six years it was in nearly the same uniform brown plumage as that in which it had been originally received, and which at that time had led Mr. Sclater to suppose it to be the young of the Common Condor (*Sarcorhamphus gryphus*). Mr. Sclater had now come to the conclusion that this must be a specimen of the "*Condor pardo*," or Brown Condor, spoken of by Mr. J. Orton[1], and subsequently named *Sarcorhamphus æquatorialis* by Sharpe in his 'Catalogue of Birds in the British Museum' (i. p. 21).

Mr. Sclater exhibited a water-colour drawing of this curious bird (Plate XXXV.), and pointed out that it differed from the Common Condor in its smaller size, nearly uniform brown plumage, and brown ruff. The example in the Gardens had no caruncle on the head, and was perhaps a female bird, as the specimen seen at Amsterdam by Mr. Sharpe was stated to have a perfectly formed erectile wattle.

Mr. G. French Angas exhibited a collection of Butterflies from Dominica, West Indies, made during a seven weeks' residence in that island in February and March last.

The following papers were read:—

1. Embryological Testimony to General Homology.

By Prof. Owen, C.B., F.R.S., F.Z.S., &c.

[Received April 18, 1883.]

In my researches on the 'Archetype of the Vertebrate Skeleton'[2], I was led to regard the limbs, severally, as an appendage of a hæmal arch, diverging therefrom with a free termination. In the majority of these appendages their distal end does not push through the integument: this condition is represented by the "pleural spines" in Fishes (*op. cit.* pl. ii. fig. 2, *a*, *a*), and by the "costal appendages" in Crocodiles (ib. fig. 3, *a*, *a*) and Birds (ib. fig. 4, *a*, *a*). The only appendicular elements of the vertebral segment which do push through and undergo diverse degrees of adaptive developments, as "limbs," are those in which such development may be traced from the primitive form in *Lepidosiren* and *Protopterus* (ib. fig. 7, *a*) to that of the many-rayed and jointed diverging appendage of the scapular arch, or "pectoral fin," in other Fishes, and of the varied forms and modifications of the fore and hind limbs in higher Vertebrates.

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[1] 'The Andes and the Amazon,' by James Orton, 3rd ed., New York, 1870, p. 565.

[2] 8vo, 1848, pp. 72, 101.

This homological generalization implied and inferred that the embryonal basis of such diverging appendages should be a continuous fold of blastema on each side of the body, projecting some way between the neural, or upper, and the hæmal, or lower, primitive folds, in which the unpaired fins, dorsal and anal, are developed in Fishes.

To raise the foregoing generalization[1] from the hypothetical level required the evidence of the competent embryologist, and such, by common consent, was the late lamented Biological Lecturer of Trinity College, Cambridge.

After treating of the development of the "Pectoral and Pelvic Girdles," Prof. Balfour proceeds to that of the "Limbs."

"The first rudiments of limbs appear as slight longitudinal ridge-like thickenings of the epiblast, which closely resemble the first rudiments of the unpaired fins"[2]. The anterior portion of the lateral ridge is "immediately behind the last visceral fold"; the posterior portion is "on the level of the cloaca"[3]. "In some Elasmobranch embryos, more especially in *Torpedo*, they are connected together at their first development by a line of columnar epiblast-cells"[4]; but "this connecting line of columnar epiblast is a very transitory structure, and after its disappearance the rudimentary fins become more prominent"[5]. "The connexion of the two rudimentary fins [of one and the same side] by a continuous epithelial line suggests the hypothesis that they are remnants of two continuous lateral fins"[6].

Whether the first recognizable trace of the locomotive fin be in the form of a single ray, or of "a median axis and two rows of rays," would be, on proof and acceptance, a test of the hypothesis of the rays or plates diverging or continued from the arches homologous serially with the pectoral and pelvic supporters of their more developed "diverging appendages."

Prof. Gegenbaur, who maintains the embryological evidence of the "primitive type of fin, consisting of a central multisegmented axis with numerous rays," confers on this alleged incipient form the term "archipterygium." Professor Balfour, accepting the term as applied to the limbs of Fishes, calls the embryonal limb of *Amniota* the "cheiropterygium."

After repeating that "the limbs arise as simple outgrowths of the sides of the body formed both of epiblast and mesoblast," and that "in the 'Amniota' they are processes of a special longitudinal ridge, known as the Wolffian ridge," he notes that "both limbs have at first a precisely similar position, both being directed backwards and being parallel to the surface of the body"[7].

The parts of the limb or fin as they successively appear are first a ray diverging from, or near to, the articular interspace between the scapula and coracoid, or the ilium and pubis. This primitive condition of limb he terms, in Fishes, the "basipterygial bar"[1], and represents it as such in his figure 346, under the letters *mpt*, of a section of the embryonal pectoral fin in *Scyllium stellare*.

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[1] "The serial homology of the pectoral and pelvic limbs with the shorter appendages (*a*, *a*) of the succeeding arches is unmistakable. If, then, the diverging rays of the thoracic and abdominal vertebræ of Fishes, of Reptiles, and of Birds be the serial repetitions of the more developed appendage of the scapulo-coracoid arch, they must be 'rudimental limbs.'" ('On the Nature of Limbs,' 8vo, 1849, p. 65.)

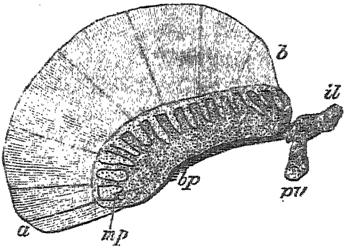
[2] Treatise on Comparative Embryology, 8vo, 1881, vol. ii. p. 500.

[3] *Ibid.* [4] *Ibid.* [5] *Ibid.* [6] *Tom. cit.* p. 501. [7] *Tom. cit.* p. 508.

So, in Fishes, "In both fins the skeleton in its earliest stage consists of a bar springing from the posterior side of the pectoral or pelvic girdle, and running backwards parallel to the long axis of the body. The outer side of this bar is continued into a plate which extends into the fin, and which becomes very early segmented into a series of parallel rays at right angles to the longitudinal bar[2]. In other words, the primitive skeleton of both the fins consists of a longitudinal bar running along the base of the fin, and giving off at right angles a series of rays which pass into the fin. The longitudinal bar, which may be called "basipterygium," is moreover continuous in front with the pectoral or pelvic girdle as the case may be"[3].

Gegenbaur and his followers believed the "bar" and "rays" to be contemporaneous in appearance; and truly they come early into view and follow quickly. Balfour, however, derived, from apparently closer or earlier observation, the conviction that they showed two stages, and that the "rays" were consecutive in appearance to the "bar"[4].

If this view, as is probable, be preferably accepted, the "diverging appendages" of the hæmal arches or so-called "girdles," intervening between the scapular and pelvic ones, may be viewed as "embryonal limbs" arrested at the "bar-stage." It may be objected that such "costal appendages," as a rule, are lâmellar, or in form of a "plate" rather than a "bar;" but such is the shape assumed by the primordial fin, when the "basipterygium" (annexed figure, *bp*) becomes the "metapterygium" (ib. *mp*), or sustainer of the "mesopterygium," or rudiment of the consecutive or future "pro- and mesopterygia" (*a*, *b*).



Chondropterygian embryonal fin (after Balfour).

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[1] *Tom. cit.* p. 504.

[2] *Tom. cit.* p. 502.

[3] *Tom. cit.* p. 502.

[4] *Tom. cit.* p. 501.

While in the embryonal or cartilaginous stage, both "pleurapophysial" or iliac (ib. *il*) and "hæmapophysial" or pubic (ib. *pa*) sustainers of the developed, and in Fishes fin-like, "appendage" of such pelvic arch are continuous with the primitive "bar" or plate (*bp*, basipterygium). But if they are so evolved as secondary and subordinate members, their subsequent ossification exemplifies their claim as independent or distinct elements of their vertebral segment.

Lepidosiren and *Polypterus* retain the later segmentation of the "basipterygium," with feeble rudimentary indications of rays in the narrow skin-fold which it supports. The proximal piece of the fin-skeleton of *Ceratodus*, like that of *Lepidosiren*, answers to the basipterygium=metapterygium, not to the mesopterygium, which, as Balfour shows, is a secondary character, and is not developed in certain Fishes, e. g. *Scyllium*.

I cannot conclude without quoting the last letter with which I was favoured by my friend:—

"Trinity College, Cambridge,
Dec. 7th, 1881.

"DEAR PROFESSOR OWEN,

"I am much obliged to you for your kind note about my paper on the 'Development of the Paired Fins.' I accept the justice of your criticism on my use of the term 'girdle.' I used the term merely because it was a term in common use, and must plead guilty to never having troubled myself about its derivation[1]. I shall, however, in future use the expression 'arch' instead.

"Very sincerely yours,
"F. M. BALFOUR."

2. On some new Genera and Species of Spiders.

By the Rev. O. P. CAMBRIDGE, M.A., C.M.Z.S., &c.

[Received April 23, 1883.]

(Plates XXXVI. & XXXVII.)

Eight Spiders, representing, as it appears to me, as many new genera, are described and figured in the present paper from examples in my own collection. Two of them belong to the family Theraphosidæ, one to the Drassidæ, and the remaining five to the Thomisidæ. Three species are from Ceylon, three from Caffraria, one from New Zealand, and one from California. For the Ceylon species I am indebted to the late Mr. G. H. K. Thwaites; for those from Caffraria to Mr. Mansel Weale; for the New-Zealand species to Captain F. W.

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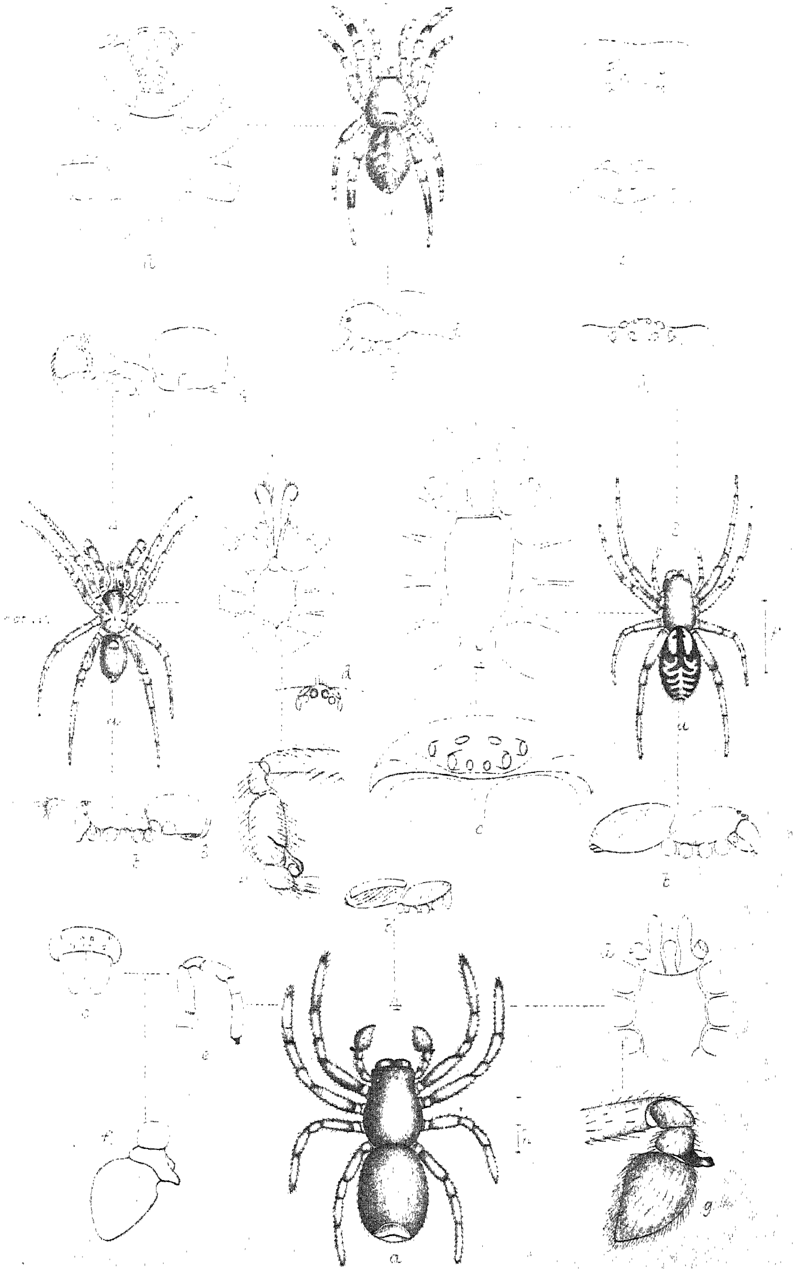
[1] "GIRDLE—Belt or Zone. Any thing drawn round the waist and tied or buckled."—*Johnson*.

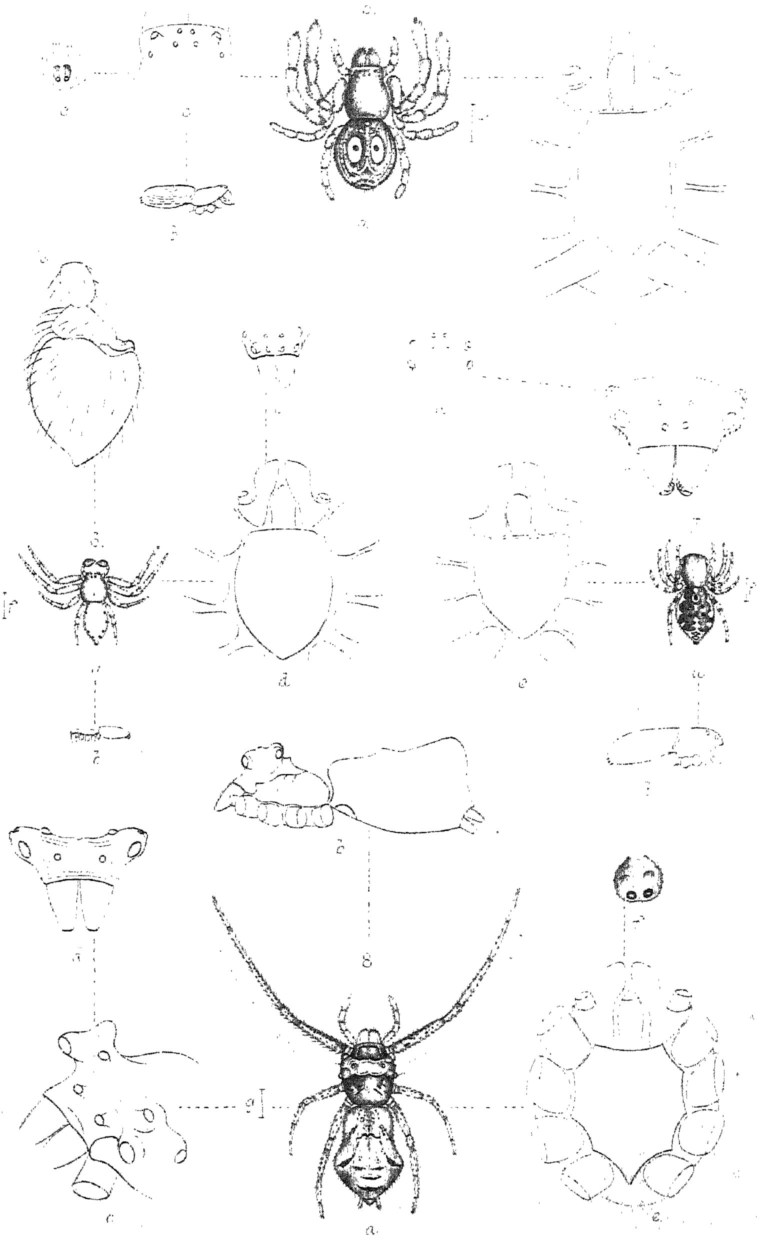
The "pelvic arch" is inverted; its piers, as a rule, are based on the sacrum: the "pectoral arch" is inverted, and its piers, save in most Fishes, are free.



O. P. Cambridge del.
E. Carter sc.

Mintern Bros. imp.

NEW GENERA & SPECIES OF SPIDERS.



O. P. Cambridge del.
E. Carter sc.

Mintern Bros. imp.

Hutton; and to Mr. J. J. Rivers of Berkeley, California, for the exceedingly remarkable species (allied to the European *Atypus*) from that region. Want of leisure alone has prevented my being able as yet to work out more of the valuable collections received from all of the above sources.

THERAPHOSIDÆ.

THERAPHOSINA.

SARPEDON, g. n. (nom. propr.).

Cephalothorax as broad as long, tolerably convex above, rather higher a little in front of the thoracic indentation than at the eyes; no lateral marginal indentation at caput; that at the thoracic junction is long, deep, transverse, and very nearly straight, if any thing the slightest possible curve has its convexity directed forwards. The height of the clypeus is equal to about half that of the facial space.

The *eyes* are unequal in size and form a rather large transverse rectangular space as nearly as possible double as long as it is broad; two of the largest form a transverse line in the middle of the space, separated from each other by somewhat more than a diameter's interval, and each with the other eyes on its side forms an equilateral triangle; contiguous to each of the hind-lateral eyes is that one which corresponds to the hind-central in ordinary Spiders; it is very minute and of a pearly white colour.

Legs short, strong; not very unequal in length, 4, 1, 2, 3; they are furnished with hairs (but not densely), and a few fine, bristle-like spines beneath those of the first and second pairs; a well-expanded dense scopula occupies the underside of the tarsi and metatarsi of the first and second pairs; the tarsi end with two (apparently untoothed) claws, and beneath them is a dense claw-tuft.

The *palpi* are clothed like the legs, with a scopula beneath the digital joint, which ends with a single simple claw.

Maxillæ rather long, strong, cylindrical, with the slightest possible prominence at their extremity on the inner side; towards their base on the same side is a short straight transverse row of (2–4) small black but distinct denticulations.

Labium of fair size, and quadrate in form, a little longer than broad; the apical margin is straight and armed with a single row of sharp black denticulations.

Sternum longer than broad, and broader towards the hinder part than in front. The hinder extremity is drawn out into a point between the insertion of the basal joints of the fourth pair of legs.

Abdomen short, and projects well over the base of the cephalothorax.

Spinners 4, the superior pair short, 3-jointed, very strong, and upturned as is usual in this family; those of the inferior pair very minute, cylindrical, and placed close beneath, in fact almost between, the superior ones.

SARPEDON ROBUSTUM, sp. n. (Plate XXXVI. fig. 1.)

Adult female, length $5\frac{1}{3}$ lines.

The *cephalothorax* is of a rich dark reddish-brown hue, clothed thinly with long bristles, chiefly on the caput.

The *legs* and *palpi* are yellowish, the basal joints tinged with brown and strongly suffused with deep reddish brown, chiefly on the anterior half of the joints.

The *sternum* and *labium* are similar in colour to the basal joints of the legs.

The *falces* are of moderate length and strength, and not quite so rich in colour as the cephalothorax.

The *abdomen* is of a deep blackish brown tinged with a purplish hue, and pretty thickly clothed with hairs, mostly short; it has on its upperside two longitudinal curved converging rows of yellowish maculæ, the anterior ones indicating the position of the heart, and the posterior ones forming the usual transverse angular lines or chevrons.

So distinct a pattern is not usual in this family, and bears much resemblance to that found in the genus *Amaurobius*.

On the underside the four spiracular plates are of a brownish-yellow colour, and behind them towards the spinners are four maculæ of the same hue, and forming nearly a square.

Two examples of the female of this very distinct and remarkable Spider (which appears to be allied to the S.-African genus *Moggridgea*, Cambr.) were received a few years ago from the late Mr. G. H. K. Thwaites from Ceylon. Nothing is known of its habits; but I should not be surprised to learn that it was one of those Spiders which form a trapdoor nest, though not excavating a hole for itself, to do which it has none of the requisite armature either on the falces, palpi, or legs.

ATYPINA.

ATYPOIDES, g. n.

Cephalothorax oblong-oval, rather truncate before the caput, rising gradually (but not to a great height) to the eyes from the thorax, which is rather depressed. Thoracic indentations strong; that at the junction of thorax and caput longitudinal.

Eyes of fair size for this family, and not greatly unequal, situated at the apex of the somewhat drawn-out fore extremity of the caput, two in a transverse line, less than half a diameter's distance from each other, in the centre, with three others close on the outerside of each, in a compact triangle, the anterior eye in each triangle being the largest of the eight. The central eyes are dark grey, the rest shining pearl-white.

Legs moderately long and strong; relative length apparently 4, 1, 2, 3, but their absolute length not greatly different; furnished with spines of varied length and strength, strongest and most numerous in the female; the metatarsi and tarsi, however, of the first pair are devoid of them in the male.

Palpi leg-like in the female, armed as the legs and ending with a single curved claw.

Falces strong, prominent and massive, considerably gibbous at the base on the upperside, the gibbosity greatly prolonged forwards in a curved form in the male.

Maxillæ short, broad, convex in front and prominent in an obtusely conical form at the base, with only a slight subconical prominence at the extremity on the inner side.

Labium short, somewhat subtriangular, its apex rounded, and its base inserted into a deep rounded indentation of the sternum, which is oval, with a round impressed spot on the margin opposite to the insertion of the basal joints of the first three pairs of legs.

Abdomen short, oval; very convex above, with a bare, subtriangular, or somewhat kidney-shaped patch on the upperside near the fore extremity. *Spinners* 6; an inferior transverse row of four, of which the outer ones are very small; the superior pair long, upturned, and three-jointed.

ATYPOIDES RIVERSII, sp. n. (Plate XXXVI. fig. 2.)

Adult male, length 6 lines.

Cephalothorax greenish brown; caput dark and of a reddish-brown tinge, marked on its surface with minute punctures.

Legs similar in colour to the thorax, those of the two foremost pairs being darkest; the terminal tarsal claws are three, the superior pair long and pectinated, the inferior claw small.

Falces darker than the caput; they have an extraordinary appearance from the two long, projecting, curved apophyses at their base; these are cylindrical, obtusely pointed, and densely clothed at and near their extremity, above and on the sides, with long coarse bristly black hairs; the extremity of the falces in this sex (♂) have no spines on the upperside.

Maxillæ similar in colour to the caput.

Palpi long, strong, similar to the fore legs in colour; the radial joint is double the length of the cubital, of an elongate-oval or tumid form, clothed underneath with strong hairs; digital joint short, broadest and truncate at its fore extremity, where it is also clothed with long bristly black hairs. The palpal organs are small, of a rather irregular pyriform shape, whose stem (directed backwards close by the side, rather underneath the fore part of the radial joint) is formed by a terminal sharpish-pointed spine.

The *abdomen* is of a dull purplish-brown hue, very like that of the European *Atypus piceus*, Sulz., freckled with small brownish-yellow points, and a transverse kidney-shaped bare yellow-brown patch at the fore extremity of the upperside. The general surface of the abdomen is thinly covered with fine hairs. The *spinners* are brown; the two terminal joints of the superior pair paler.

The *female* resembles the male in colour, but the hinder slope of the caput is more abrupt, and the fore extremity more obtuse.

Instead of the long projections of the falces, there is on each a simple strong subconical prominence directed a little backwards.

The whole falces are, however, more massive than in the male, and they are furnished with strong spines above at the extremities. The spines also on the legs are stronger, and are found on the metatarsi of the first pair as well as of the last. The palpi are also furnished with strong spines, and the legs themselves are shorter.

Examples of this most interesting Spider were kindly sent to me by Mr. J. J. Rivers from Berkeley, California, who tells me that it tunnels in banks mostly by streams, forming a tubular projection above ground of any material at hand, woven up with silk, making no trapdoor, but closing the aperture at times. It has a close general resemblance to *Atypus*; but the very different form of the maxillæ distinguishes it at a glance and necessitates the formation of a new genus for its reception. It is with much pleasure that I connect Mr. Rivers's name with this Spider.

DRASSIDÆ.

AMAUROBIOIDES, g. n.

Cephalothorax oblong, its length double its breadth; the lateral marginal constriction at the caput is slight but perceptible; the profile forms a continuous curve from the hinder slope to the fore extremity; normal indentations very slight.

Eyes of moderate size, placed on slight tubercles on somewhat of a prominence, in two transverse slightly curved rows at the middle of the fore part of the caput close to the margin, and forming a segment of a circle; the posterior pair is much the longest; their position is very like that of *Clubiona*, but they form a less laterally extended area.

Legs moderate both in length and strength, 1, 4, 2, 3, the difference between 1 and 4 being very slight; furnished with hairs and spines; the latter, chiefly beneath the tibiæ and metatarsi, few and fine; a not very dense scopula beneath the tarsi and metatarsi; tarsal claws 2, pectinated, and below them is a claw-tuft.

Falces long, powerful, prominent at their base in front and strongly arched in profile.

Maxillæ long, strong, enlarged and divergent at their anterior extremity, where they are rounded on the outer side, but obliquely truncated on the inner side.

Labium oblong-oval; more than half the length of the maxillæ.

Sternum elongate-oval, pointed behind and truncated in front.

Abdomen oval and of moderate convexity on the upperside. *Spinners* compact, of uniform length, moderately long and strong; those of the inferior pair much the strongest.

AMAUROBIOIDES MARITIMA, sp. n. (Plate XXXVI. fig. 3.)

Adult female, length rather more than 5 lines.

Cephalothorax dark yellow-brown, deepening to red-brown and black on the caput; clothed thinly with short fine hairs; the height of the clypeus is no more than equal to the diameter of one of the fore-central eyes.

Eyes of a dark yellowish-grey colour; those of the posterior row are about equally separated from each other, the hind-centrals being rather smaller than the hind-laterals; the fore-centrals are minute, much the smallest of the eight, difficult to be seen, and equally removed from each other and the fore-laterals; the four central eyes form a rectangular figure whose posterior side is the longest and its anterior the shortest.

Legs yellow-brown; the tibiæ, tarsi, and metatarsi of the first and second pairs dark reddish brown.

Palpi similar in colour to the first two pairs of legs, and ending with a small curved claw.

Falces nearly black, with some strong teeth on the inner margin near the fore extremity; their anterior surface is roughened or finely rugulose, and the fang strong.

Maxillæ and *labium* deep blackish red-brown.

Sternum yellowish brown, with prominences round the margins, opposite the insertions of the legs.

The *abdomen* projects fairly over the base of the cephalothorax; its upperside is yellow, with a strong central longitudinal bar on the fore half, strongly bifid in a fish-tail form at its hinder extremity, and with two or three prominent spots or blunt points on the sides; following this to the spinners are five transverse angular bars or chevrons divided or interrupted at the angles; all these markings are of a deep blackish chocolate-brown, the sides being of the same colour, softening off gradually into yellowish on the underside; a large obtuse patch of the dark colour obtrudes from the sides at the fore part into the upper yellow area, touching (on each side) the middle prominent point on the side of the central longitudinal bar; the sides are also traversed by a curved, more or less continuous, yellow tapering stripe, which breaks out from the middle of the upper surface and runs obliquely backwards; there are also a few more yellow spots behind these, sometimes forming curved lines, which also run obliquely backwards.

Genital aperture small and not very conspicuous.

An adult and three immature examples of the female of this Spider, found by the late Dr. Smith on rocks in the sea at Allday Bay, Otago, were sent to me by Captain F. W. Hutton. They came to me labelled "Marine Spiders;" but whether *marine* in the sense of passing any portion of their existence under water, like *Robsonia marina*, I do not know.

Independently of any peculiarity of habit, however, this Spider is of great interest as being undoubtedly a Drassid, but bearing a near resemblance to *Amaurobius* in general form, appearance, and pattern; while in its *eye-position*, *maxillæ*, and *falces* it is most like *Clubiona*, the falces especially being very similar to those of *Clubiona holosericea*, De Geer.

THOMISIDÆ.

CYRSILLUS, g. n. (nom. propr.).

Cephalothorax oblong, tolerably convex and evenly rounded above; lateral marginal indentation at caput slight; normal grooves and indentations imperceptible.

Eyes small, in two transverse rows, occupying the greater part (nearly the whole) of the width of the caput; the anterior row considerably the shortest, slightly, if at all, curved; the posterior row much more curved; the convexity of the latter curve is directed forwards; the four central eyes are the smallest, and form a small trapezoid whose anterior side is the shortest; the eyes of the hind-central pair are exceedingly minute and difficult to be seen; the fore-laterals are the largest of the eight.

Legs not very long, strong, 1, 2 (or 2, 1 ?), 3, 4; their length is not greatly different from each other, the difference between 1 and 2 is exceedingly slight. The articulation between the tarsi and metatarsi is almost obsolete, being (especially in those of the first and second pairs) almost imperceptible, the faintest possible transverse line alone being visible; as a joint, it can scarcely be of any use; the length of the tarsus is considerably more than that of the metatarsus. They are furnished with hairs only; each tarsus ends with two (apparently not dentated) curved claws, and some, somewhat claviform, hairs occupy the underside of the anterior portion of the tarsi, but scarcely to be called a scopula.

Maxillæ. These were not easy to be seen with perfect accuracy owing to some adventitious matter collected about them; but, so far as they could be observed, they are rather long, narrow, straight, and pointed at the extremities.

The *labium* appeared to be narrow-oblong, about half the length of the maxillæ, rather broadest and truncate at the apex.

The *sternum* is oblong-oval, truncate (in a slightly hollow line) at the fore extremity.

Abdomen roundish oval, flattish on its upperside, and projecting fairly over the base of the cephalothorax.

CYRSILLUS DRASSIFORMIS, sp. n. (Plate XXXVI. fig. 4.)

Adult male, length 2 lines.

The *cephalothorax* is black, thinly clothed with hairs and short bristles, and its surface has a roughened or somewhat pock-marked appearance.

The *eyes* of the hind-central pair are considerably nearer to each other than each is to the lateral on its side; and this is also the case in respect to the anterior row, which is, however, much shorter than the posterior. The height of the clypeus is less than half that of the facial space.

The *legs* are of a deep rich blackish mahogany colour, the femora and genua deeper than the rest.

The *falces* are moderately long, strong, conical, vertical; their anterior surface is flattish, with an exterior angular margin or edge, and their colour is similar to that of the cephalothorax. The colour of the maxillæ and labium is like that of the legs, while that of the sternum resembles the cephalothorax.

The *palpi* are short and strong; the radial joint is a little shorter than the cubital, and its outer side has two strong obtuse apophyses; the anterior is the longest, prominent, and somewhat bent; from some points of view these apophyses look like one large bifid projection. The digital joint is large and oviform; the palpal organs are simple, with a strong corneous process, or spine, round the inner margin.

The *abdomen* has its flattened upperside covered with a kind of coriaceous shield, of a deep blackish hue; around the margins are some short dull golden hairs (possibly these may originally have been more numerous and more widely spread over the surface); the sides are of a warm purplish brown, deeply and longitudinally rugulose, and the colour of the underside is similar. The *spinners* are very short and counter-sunk in a sort of pit or depression, beyond the margin of which they scarcely appear.

An example of this Spider was given to me among those found in Caffraria by Mr. Mansel Weale. It is a very remarkable one, not only on account of its general form, which gives it some resemblance both to the Drassidæ and Palpimanidæ, but also in respect to the structure of the legs, especially the long tarsi, which are, as above noticed, scarcely divided from the metatarsi.

CASTUROPODA, g. n. (*κάστωρ*, a beaver, *οὐρὰ*, tail, *ποδὰ*, feet).

Cephalothorax broad, rather longer than broad, only slightly convex above, broadly truncate in front, and considerably constricted laterally on the margins of the caput, the other normal indentations being obsolete.

Eyes placed much as in *Xysticus*, but occupying a wider transverse area; they are small and seated on tubercles; the fore-laterals are largest, the four centrals very small, and form nearly a square, of which the posterior side is slightly longest; the hind-central eyes are the smallest.

Legs moderately long, 2, 1, 3, 4, the difference between 2 and 1 very slight. They are strong, especially those of the first and second pairs, whose anterior joints are of abnormal size. The form of the tarsi bears no small resemblance to a beaver's tail. The legs are furnished with short hairs only, those beneath the tarsi forming a scopula; the tarsi end with two curved (and apparently nonpectinated) claws.

Falces moderate in length, subconical, massive; but the fang is short and weak; on the inner side of the anterior extremity of each falx is a short row of small but distinct denticulations regularly diminishing from the fore extremity.

Palpi short, ending with a small curved claw.

Maxillæ long, straight, pointed at their extremity on the inner side, and rounded on the outer extremity, showing a considerable constriction about the middle of the outer side.

Labium about half the length of the maxillæ, somewhat obtusely pointed at the apex, and narrower at the base than at the middle.

Sternum elongate-oval, pointed behind and hollow-truncate before.

Abdomen short, broad, round-oval, of a flattened form, rather truncate before, and fitting well up to the base of the cephalothorax.

CASTUROPODA SIGILLATA, sp. n. (Plate XXXVII. fig. 5.)

Adult female, length $2\frac{2}{3}$ lines.

The colour of the *cephalothorax*, *falces*, *legs*, and *palpi* is a rich dark mahogany-brown.

The surface of the *cephalothorax* and *falces* has a roughened appearance, being granulose or punctuose; the latter, as well as the sides and hinder part of the former, are furnished with short bristly hairs; the fore margin of the caput has also a single row of short strong prominent bristles. The height of the clypeus is only equal to the diameter of one of the fore-central eyes.

The *maxillæ*, *labium*, and *sternum*, as well as the basal joints of the legs, are yellowish brown.

The *eyes* of the hind-central and fore-central pairs are respectively nearer together than each is to the lateral eye of its row on the same side.

The *abdomen* is of a dark greenish olive-brown hue, deepest on the upperside, which is of a somewhat coriaceous nature, and where there are in a transverse line on the middle two large oval rusty-brown seal-like markings, near together, and each marked in the centre with one of the two posterior of the five normal Thomisid impressed spots or markings, and of a deeper red-brown colour; the other three of these normal spots form a triangle immediately in front of the sigilliform markings, the apex directed forwards and close to the fore extremity of the abdomen. A pale yellowish streak or line runs from the apex of this triangle to a little way beyond the posterior impressed spots, and is succeeded by several short transverse pale curved lines, from the ends of each of which similar lines run parallel to each other round the sides and outer portion of the upperside of the abdomen. In some parts these lines are formed by small pale dots. The spinners are short and of a pale dull yellowish hue. The abdomen is thinly clothed with short hairs.

The whole Spider has a very flattened form.

An adult and an immature female, as well as an immature male, were sent to me some years ago from Ceylon by the late Mr. G. H. K. Thwaites. The size and peculiar form of the anterior pair of legs make this Spider a very remarkable one. This character, together with its other structural features, have induced me to base a new genus upon it, though it has some strong points of affinity to the preceding species *Cyrsillus drassiformis* (p. 358, *anteà*).

NESIS, g. n. (nom. propr.).

Allied to *Diæa*, Thor.

Cephalothorax as long as broad, truncated in front, constricted laterally at the margins of the caput; upper surface flat and level.

Eyes small and not greatly different in size (though the four centrals are distinctly smallest), seated on separate tubercles, of a greyish hue, and occupying the whole width of the fore part of the caput. Height of clypeus less than the diameter of one of the fore-central eyes. The position of the eyes is much the same as in *Xysticus*.

Legs moderate in length and strength; those of the first and second pairs much the longest; the second pair slightly exceed the first, and the third pair rather shorter than the fourth. They are armed with a few regularly disposed slender spines beneath the tibiæ and metatarsi of the first and second pairs; beneath the tarsal claws is a small claw-tuft.

Falces moderate in length and strength, subconical, and perpendicular.

Maxillæ long, enlarged at the extremities, where they are obliquely and slightly roundly truncated on the outer side, and inclined over the labium.

Labium rather more than half the length of the maxillæ, constricted laterally near the middle, and somewhat pointed at the apex.

Sternum oval, truncated before and pointed behind.

Abdomen of a somewhat oblong form, truncated before and pointed behind, and very flat.

NESIS NIGROPUNCTATUS, sp. n. (Plate XXXVII. fig. 6.)

Adult male, length 2 lines.

The *cephalothorax*, *legs*, and *palpi* are of a brownish orange-yellow hue; the former with a fine dark marginal line; the whole of the underside, including the abdomen both above and below, being paler and duller-coloured.

The *eyes* of the anterior row (which is the shortest and least curved) are almost equally separated from each other; the central pair of the posterior row are nearer together than each is to the lateral on its side; the four central eyes form a square, whose anterior side is slightly the shortest, and its posterior side distinctly the longest. The tubercles supporting the lateral eyes are strong and of a subconical form.

The *palpi* are short; the radial joint is shorter than the cubital, and has its extremity on the outer side produced into a strong apophysis, whose extremity is pointed, and of a bent or twisted and slightly corkscrew form; the digital joint is large, nearly round, with a rather abrupt point at its fore extremity. The palpal organs are simple, and encircled with a long, strong, black, fine-pointed spine.

The *abdomen* has on the margins of its upperside (chiefly on the hinder part) a single row of small but distinct black spots. Spinners small; those of the inferior pair strongest.

Two adult males of this Spider (remarkable for its flattened form) were contained in the collection made in Caffraria by Mr. Mansel Weale.

PALÆPHATUS, g. n. (nom. propr.).

Cephalothorax. Length and breadth equal, broader in front than behind; upper convexity even and considerable; in profile, highest at the beginning of the posterior slope; there is no lateral marginal constriction at the caput, and all the normal indentations are obsolete. The height of the clypeus is equal to the length of the line formed by the fore-central pair of eyes.

Eyes considerably unequal in size, placed in three widely separated groups (although preserving the same general form of area as *Xysticus*, &c.), and occupying the whole width of the fore part of the caput. The eyes of the two lateral pairs (or groups) are seated on strong and distinct pale tubercles, and are the largest, the fore-laterals being larger than the hind-laterals; those of the central group form nearly a square, whose longitudinal is less than its transverse diameter, and the anterior side is shortest; the posterior eyes of this group are smallest, very minute, and difficult to be seen.

Legs short and almost equal in length; their relative length appeared to be 4, 2, 3, 1. They are furnished with coarse hairs only, and each tarsus ends with two curved, closely pectinated claws.

Palpi short, similar in armature to the legs, and ending with a curved pectinated claw.

Falces short, conical, vertical; fang small and weak.

Maxillæ moderately long, rounded on the outer and pointed on the inner extremity, constricted about the middle, and a little inclined over the labium, which is about half the length of the maxillæ, and of an oblong-oval form.

Sternum short, heart-shaped.

Abdomen oval, flattened on its upper surface, and projects well over the base of the cephalothorax.

PALÆPHATUS SALTICIFORMIS, sp. n. (Plate XXXVII. fig. 7.)

Immature female, length 1½ line.

The *cephalothorax* is of a mahogany red-brown colour, with a reddish yellow-brown, slightly tapering, longitudinal central stripe, reaching from the hind-central eyes to the posterior extremity. Its surface is thinly covered with impressed points or punctures, and there are a few strong hairs with some stiffer prominent bristles on the sides of the caput, near the lower margin.

Falces similar in colour to the cephalothorax, punctuose, and also furnished in front with bristly hairs.

Legs yellow-brown, darkest on the tibiæ and fore half of the femora.

Palpi similar to the legs in colour.

Maxillæ, *labium*, and *sternum* dark yellowish brown.

Abdomen deep rich maroon-brown, thinly furnished with hairs; the upperside has some irregular longitudinal (central and marginal) yellowish-white markings, with a considerable well-defined patch of the same colour just above the spinners; on the underside is a broad central longitudinal dull yellowish band, with a short narrow bar of the same between its hinder end and the spinners; six small somewhat impressed circular spots, each surrounded by a halo of dark yellow-brown, form two parallel longitudinal lines of three spots in each towards the hinder part of the central yellowish band. The spinners are of a dark brown hue, short, closely grouped together, and similar in length, but the inferior pair much the strongest.

A single example of this little Spider (which, however, may possibly attain a much larger size at its maturity) was received from Ceylon in 1871 from the late Mr. G. H. K. Thwaites. At first sight it is very like a Salticid Spider; but its structure, though strongly allied to some other Thomisid genera, seems to require a new genus for its reception.

PHERECYDES, g. n. (nom. propr.).

Cephalothorax short, broad, and nearly round.

Eyes 8, not very large, but unequal in size, occupying the whole transverse diameter of the caput, those of each lateral pair seated upon an extensive tubercular prominence, extending laterally beyond the lower part of the caput. Their relative position is that common to many Thomisid genera belonging to the *Xysticus* group, forming two nearly parallel curved transverse lines, the convexity of the curve directed forwards; the external eyes of the anterior row are the largest.

Legs neither very long nor strong; those of the second pair were wanting in the only example seen; those of the fourth pair are considerably shorter than those of the first, the third being a little shorter than the fourth. The second pair would probably be slightly shorter than the first. They are furnished thinly with hairs and a few spines, besides which beneath the tibiæ and metatarsi of the first and second pairs are some longer and stronger sessile spines arranged in successive pairs. Each tarsus ends with two curved pectinated claws.

Palpi short, and terminating with a small curved claw.

Maxillæ rather long, a little enlarged in a pointed-oval form at their extremity, and inclined over the *labium*, which appears to be of a rather narrow or oblong form, as if lanceolate, with the point of the lancet (at its apex) truncated; but this portion of structure, owing to some adventitious substance obscuring it, could not be satisfactorily determined.

Sternum heart-shaped.

Abdomen of a somewhat pentagonal form, broadest and highest behind. *Spinners* small; those of the inferior rather stronger than those of the superior pair.

PHERECYDES TUBERCULATUS, sp. n. (Plate XXXVII. fig. 8.)

Adult female, length 2 lines.

The colour of the *cephalothorax* is light whitish yellow tinged with brown; the caput is strongly marked, mottled, and suffused with deep yellow-brown; the thorax has a fine submarginal line, as well as some converging lines and other markings, of the same hue. The height of the clypeus is equal to half that of the facial space. On the caput are a few shortish bristly hairs.

The *eyes* of the hind-central pair are much wider apart than each is from the lateral eye on its side; the same proportionate separation is observable, though not to the same degree, in the eyes of the anterior row. The fore-centrals are the smallest of the eight.

The *legs* are of a pale dull yellowish hue, with a few obscure blotches of white, and more or less marked and spotted with blackish brown.

The *falces* are similar in colour to the cephalothorax, thinly mottled and marked with dark yellow-brown.

The *maxillæ* and *labium* are pale whitish yellow-brown.

The *sternum* is similar to the falces in colour; its central portion deep yellow-brown.

The *abdomen* is thinly clothed with hairs and a few short bristles; its colour is a dull whitish yellow tinged with brownish, somewhat speckled and marked with yellow-brown and deep black-brown; some of the deeper markings are lineate and oblique, others, towards the hinder part, are transverse; a small elevation halfway between the fore extremity and the beginning of the hinder slope is marked with a somewhat curved, transverse, geminated spot, forming probably a characteristic central abdominal marking. The underside has a broad longitudinal central band suffused with sooty brown, deepest along its margins.

An example of this curiously formed Spider was received from Mr. Mansel Weale, by whom it was found in Caffraria. It is evidently allied to *Monastes*, Luc.; but a consideration of its abnormally formed caput and some other characters have induced me to found a new genus upon it.

List of Species described.

Theraphosidæ.

Sarpedon robustum, gen. et sp. nov., p. 354, Pl. XXXVI. fig. 1. Ceylon.

Atypoides riversii, gen. et sp. nov., p. 355, Pl. XXXVI. fig. 2. California.

Drassidæ.

Amaurobioides maritima, gen. et sp. nov., p. 356, Pl. XXXVI. fig. 3. New Zealand.

Thomisidæ.

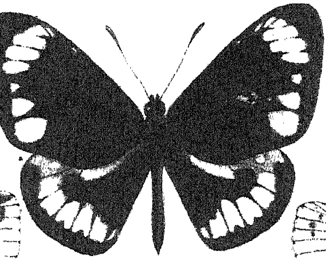
Cyrsillus drassiformis, nov. et sp. nov., p. 358, Pl. XXXVI. fig. 4. Caffraria.

Casturopoda sigillatu, gen. et sp. nov., p. 360, Pl. XXXVII. fig. 5. Ceylon.

Nesis nigropunctatus, gen. et sp. nov., p. 361, Pl. XXXVII. fig. 6. Caffraria.

Palæphatus salticiformis, gen. et sp. nov., p. 362, Pl. XXXVII. fig. 7. Ceylon.

Pherecydes tuberculatus, gen. et sp. nov., p. 363, Pl. XXXVII. fig. 8. Caffraria.



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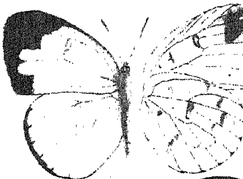

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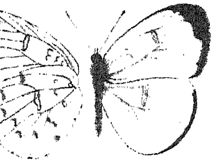

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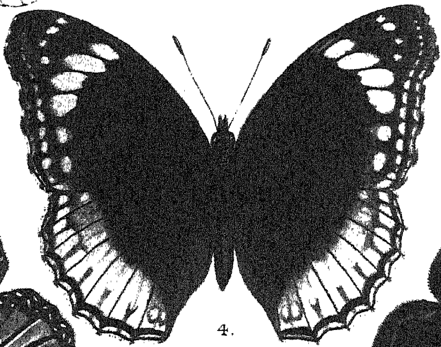

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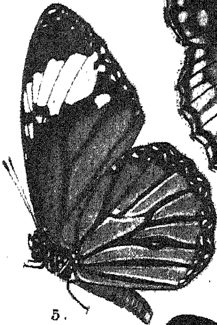

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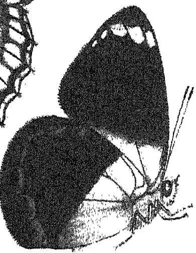

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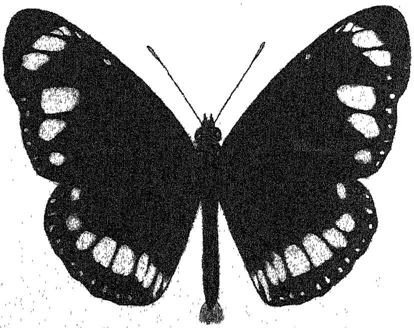

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A. H. Searle, del et lith

Mintern Bros. imp.

BUTTERFLIES FROM TIMOR-LAUT.

EXPLANATION OF THE PLATES.

PLATE XXXVI.

Fig. 1. *Sarpedon robustum* ♀, p. 354.
a, Spider, magnified; *b*, ditto, in profile *c*, eyes, from above and behind; *d*, underside of cephalothorax, showing maxillæ, sternum, and labium; *e*, spinners, from underneath; *f*, natural length of Spider.

2. *Atypoides riversii* ♂ & ♀, p. 355.
a, Spider, natural size; *b*, profile of ♂; *c*, profile of ♀; *d*, eyes, from above and behind; *e*, underside of cephalothorax, showing maxillæ, labium, sternum, and falces of ♂; *f*, left palpus of ♂, from outer side.

3. *Amaurobioides maritima* ♀, p. 356.
a, Spider, magnified; *b*, ditto, in profile; *c*, eyes, from in front; *d*, eyes, from above and behind; *e*, underside of cephalothorax, showing maxillæ, labium, and sternum; *f*, natural length of Spider.

4. *Cyrsillus drassiformis* ♂, p. 358.
a, Spider, magnified; *b*, ditto, in profile; *c*, eyes, from in front; *d*, underside of cephalothorax, showing maxillæ, labium, and sternum; *e*, leg of first pair; *f*, *g*, left palpus in two positions; *h*, natural length of Spider.

PLATE XXXVII.

5. *Casturopoda sigillata* ♀, p. 360.
a, Spider, magnified; *b*, ditto, in profile; *c*, eyes, from above and behind; *d*, underside of cephalothorax, showing maxillæ, labium, and sternum; *e*, genital aperture; *f*, natural length of Spider.

6. *Nesis nigropunctatus* ♂, p. 361.
a, Spider, magnified; *b*, ditto, in profile; *c*, eyes and falces, from in front; *d*, underside of cephalothorax; *e*, left palpus, from in front; *f*, natural length of Spider.

7. *Palæphatus salticiformis* ♀, p. 362.
a, Spider, magnified; *b*, ditto, in profile; *c*, eyes, from in front; *d*, eyes, from above and behind; *e*, underside of cephalothorax, showing maxillæ, labium, and sternum; *f*, natural length of Spider.

8. *Pherecydes tuberculatus* ♀, p. 363.
a, Spider, magnified (legs of second pair wanting); *b*, Spider in profile; *c*, caput, in front and a little raised on one side; *d*, eyes and falces, from in front; *e*, underside of cephalothorax, showing maxillæ, labium, and sternum; *f*, genital aperture; *g*, natural length of Spider.

3. List of Lepidoptera collected by Mr. H. O. Forbes in the Islands of Timor Laut. By ARTHUR G. BUTLER, F.L.S., F.Z.S., &c.

[Received April 30, 1883.]

(Plate XXXVIII.)

Twenty-three species of Lepidoptera were obtained by Mr. Forbes in his recent expedition to Timor Laut; one of these, however, is apparently a Micro-Lepidopteron, so much rubbed and broken as to be unrecognizable; all the Moths, in fact, are in very poor condition, forming a marked contrast in this respect to the Butterflies, which are well preserved.

The following Table will give an idea of the geographical relations of the named species in this collection:—

Species of Timor Laut.	Nearest allied species.	Typical locality of the latter.
Chanapa sacerdos.	Chanapa lewinii.	North Australia.
Calliplœa visenda.	Calliplœa hyems.	Timor.
Salatura laratensis.	Salatura artenice.	Java.
Hypolimnas forbesii.	Hypolimnas polymena.	Aru.
Precis expansa.	Precis timorensis.	Timor.
Catochrysops patala.	Catochrysops patala.	Massuri.
Lampides ælianus.	Lampides ælianus.	East India
Delias timorensis.	Delias timorensis.	Timor.
Terias maroensis.	Terias excavata.	Kangra.
Terias laratensis.	Terias lifuana.	Lifu.
Appias albina.	Appias albina.	Amboina.
Appias clementina.	Appias clementina.	Amboina.
Belenois consanguis.	Belenois pitys.	Timor.
Papilio aberrans.	Papilio liris.	Timor.
Papilio inopinatus.	Papilio adrastus.	Banda, New Guinea.
Diludia casuarinæ ?	Diludia casuarinæ.	Sydney.
Ercheia dubia.	Ercheia dubia.	Rockhampton.
Lagoptera honesta.	Lagoptera honesta.	East Indies.
Lyssidia goldiei.	Lyssidia goldiei.	New Guinea.
Pinacia molybdænalis.	Pinacia molybdænalis.	Batavia.
Hymenia fascialis.	Hymenia fascialis.	Japan.

From the above, however, we may deduct the wide-ranging species *Catochrysops patala*, *Lampides ælianus*, *Lagoptera honesta*, and *Hymenia fascialis*, which leaves us 5 Timor types, 3 Australian, 2 Amboina, 2 New Guinea, 1 Aru, 1 Lifu, 2 Javan, 1 Indian. The last of these, however, is equally characteristic of the Malayan fauna, as also is that from Polynesia; these two forms therefore may be regarded as doubtful, which will leave the relative proportions of the species as follows:—Indo-Malayan 2, Austro-Malayan 10, Australian 3. The only surprising thing in this distribution is the preponderance of Timor over Aru or New-Guinea forms, the species characteristic of that island being only equalled by those from Aru, New Guinea, and Amboina combined.

RHOPALOCERA.

NYMPHALIDÆ.

EUPLŒINÆ.

1. **CHANAPA SACERDOS**, sp. n. (Plate XXXVIII. fig. 7.)

Nearly allied to *C. lewinii* of Australia; the wings much blacker, the primaries of the male velvet-black, the white spots on the primaries decidedly larger, the sericeous brand on the male of twice the length: secondaries with the discal series of white spots more regular, nearer to outer margin, and not notched as in *C. lewinii*; the submarginal spots clearer and arranged more regularly. Expanse of wings, ♂ 78 mm., ♀ 71 mm.

Larat.

2. **Calliplœa visenda**, sp. n. (Plate XXXVIII. fig. 1.)

Allied to *C. hyems* (*arisbe*, Fld.) from Timor, but much darker; the primaries of the male velvet-black, the white spots on the primaries larger, especially the two last in the series, the last of all being the largest spot in the series; submarginal dots wanting on the upper surface of primaries, but present on the secondaries, which are not bordered with pearl-white but with greyish brown; the discal spots forming a sinuous white band well separated from the margin, somewhat as in the preceding species; the usual whitish costa and cream-coloured sexual patch. Expanse of wings 64 mm.

Maroe Island.

This is one of the prettiest species in the genus, and is doubtless a copy of the preceding species.

3. **Salatura laratensis**, sp. n. (Plate XXXVIII. fig. 5.)

Allied to *S. artenice*, Cramer, of Java; but the subapical white fascia decidedly broader; no central white markings on the secondaries; the veins on the under surface of these wings less distinctly bordered with white. Expanse of wings 70–74 mm.

Larat.

NYMPHALINÆ.

4. **Hypolimnas forbesii**, sp. n. (Plate XXXVIII. fig. 4.)

♀. Allied to *H. polymena* from Aru: velvet-black shot with purple; primaries with the pattern of *H. velleda* ♀, but darker, and with all the white spots of double the size; the secondaries differ from *H. polymena* in having a series of hastate brown dashes along the internervular folds from just beyond the middle of the broad cream-coloured external area, through the centre of which a series of white spots can be dimly seen. Expanse of wings 80 mm.

Larat.

This is one of the most beautiful species in the genus; it bears a vague resemblance to *H. albula* of Timor, which, however, belongs to the *H. anomala* group.

5. **Precis expansa**, sp. n.

♀. Allied to *P. timorensis* of Wallace, from which, however, it differs in its clearer fulvous colouring above, the blackish colouring of the external area being confined to the apex, the paler coloration of the under surface, its broader and less produced primaries, and the less pronounced caudal angle to the secondaries. Wings above tawny, with black markings and bluish-centred ocelli, as in *P. erigone* of Java (Cramer, Pap. Exot. i. pl. 62. E, F), but the white markings of that species replaced by a slightly paler tint of tawny than the ground-colour; under surface as in *P. erigone*. Expanse of wings 52–54 mm.

Larat.

Why the *P.-erigone* group has been referred to *Junonia* and the scarcely differing *P. natalica* to *Precis* it would, I think, be hard to explain. *P. antigone* and *P. natalica* seem very closely allied species.

LYCÆNIDÆ.

6. CATOCHRYSOPS PATALA.

Lycæna pàtala, Kollar, Hügel's Kaschmir, iv. 2, p. 419 (1848).

♂. Maroe Island.

Does not differ from Indian specimens excepting in the slightly whiter tint of the under surface.

7. LAMPIDES ÆLIANUS.

Hesperia ælianus, Fabricius, Ent. Syst. iii. 1, p. 280. n. 79 (1793).

Larat.

Does not differ from Indian specimens excepting in its slightly inferior expanse of wing; in colouring and pattern it perfectly agrees.

PAPILIONIDÆ.

PIERINÆ.

8. DELIAS TIMORENSIS. (Plate XXXVIII. fig. 6.)

Pieris timorensis, Boisduval, Sp. Gén. Lép. i. p. 459. n. 30 (1836).

Larat.

Most nearly allied to *D. vishnu* of Moore from Java (with which species it was associated by Wallace). It differs in its superior size, the narrower black area of the upper surface, the deeply sinuated inner edge of the black area on the primaries, the apical series of spots much smaller, the fifth, as Boisduval says, "très petite et ponctiforme," whereas in *D. vishnu* this is the case with a sixth spot not present in *D. timorensis*: primaries below with the basal pale area cuneiform (not angular), pure lemon-yellow within and just below the cell, otherwise pearl-white ("la base gris-blanchâtre saupoudrée de jaune pur," *Boisd.*): secondaries with only the basi-abdominal third[1] brilliant golden yellow, suffused at its inferior extremity with bright orange; the inner edge of this area straight, not angulated as in *D. vishnu*; the submarginal red lunules narrower, of a more carmine tint, the terminal one not expanded, further from the outer margin, yet not touching the yellow area; there are in fact, as Boisduval says, "sept lunules," and not six lunules and two spots as in *D. vishnu.*

9. TERIAS MAROENSIS, sp. n. (Plate XXXVIII. fig. 2.)

♀. Nearly allied to *T. excavata* of Moore, from India, but of a decidedly deeper yellow (bright sulphur) than the female of that species; the inner edge of the external border decidedly arched, convex, not concave, towards the costa, the sinuation upon the median interspaces not so deep and more oblique (as in *T. sari*); the discal

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[1] The carelessness of Boisduval's description at this point probably misled Wallace; he says:—"La moitié antérieure d'un beau jaune de chrome." On the other hand, the yellow of *D. vishnu* has a decidedly dull creamy appearance.

markings on the under surface of secondaries less defined and arranged in a much less irregular series. Expanse of wings 42 mm.
Maroe Island.

10. TERIAS LARATENSIS, sp. n. (Plate XXXVIII. fig. 3.)

♂. Nearly allied to *T. lifuana*; above most like my "Japanese *Terias*," fig. 10 (Trans. Ent. Soc. 1880, pl. vi.), but with less-pointed primaries and narrower apical border; it, however, belongs to the *T.-æsiope* group, the primaries below being marked with a curved series of three subapical red-brown spots; other markings much as usual, all well defined; the discal series of secondaries forming a nearly straight line between the first subcostal and second median branches. Expanse of wings 39 mm.
Larat.

11. APPIAS ALBINA.

Pieris albina, Boisduval, Sp. Gén. Lép. i. p. 480. n. 62 (1836).

♂. Maroe Island.

A small example; the species was originally described as from Amboina.

12. APPIAS CLEMENTINA.

Pieris clementina, Felder, Sitzungsb. Ak. Wiss. Wien, math.-nat. Cl. xl. p. 448 (1860); Reise der Nov., Lep. ii. p. 162. n. 133, pl. 25. fig. 6 (1867).

♂. Maroe Island.

Originally described as from Amboina.

13. BELENOIS CONSANGUIS, sp. n.

Nearly allied to *B. pitys* from Timor, but a little smaller; the external border of primaries with more oblique inner edge, much broader towards the costa and without any trace of a subapical white spot: primaries below white, suffused with sulphur-yellow at the base only; external area black internally, but of a reddish clay-colour towards apex; its inner edge much less irregular than in *B. pitys*, being sinuated only on the lower radial and lower (or first) median interspaces: secondaries saffron-yellow, the external border with purplish-black internal, and reddish clay-coloured external half. Expanse of wings 48 mm.
Larat.

PAPILIONINÆ.

14. PAPILIO ABERRANS, sp. n.

Pattern and form of *Papilio liris* of Timor, which it greatly resembles on the upper surface, but the pale area on the primaries is whiter, and the submarginal spots on the secondaries sandy brown, instead of dull red; the sides of the abdomen, front of head, anus, and lateral pectoral stripe are ochreous instead of deep rose-red, and the submarginal spots on the under surface of the secondaries are ochreous buff instead of rose-red. Expanse of wings 108 mm.

♂ ♀. Larat.

There were several examples of this species in Mr. Forbes's collection, clearly showing that the differences of coloration are constant.

15. PAPILIO INOPINATUS, sp. n.

Allied to *P. adrastus* of Felder, from Ceram and N. Guinea; but the male with a broad oblique subapical white belt, which does not quite reach the outer margin and is cut by the black nervures; the fascia on the secondaries narrower, formed more nearly as in the Australian *P. ægeus*, with zigzag outer edge, but of more uniform width throughout than in that species, and of a sordid cream-colour; a scarlet spot near the anal angle, well separated from the central fascia. The female differs in the whiter and oblique belt across the primaries, the inner edge of which is not so deeply zigzag, and therefore is not angulated as in the allied species, and the outer half toward apex suffused with grey so as greatly to reduce its width; secondaries with no trace of the central white patch, the submarginal scarlet spot large, oblong, and notched in front. Expanse of wings, ♂ 144 mm., ♀ 153 mm.

♂ var. Wings shorter; the inner edge of the white band of primaries impinged upon by the discoidal cell, which also encloses a spot of the same colour as the band; the band of the secondaries broader, cutting across the end of the cell. Expanse of wings 132 mm.

Maroe Island.

HETEROCERA.

SPHINGIDÆ.

16. DILUDIA CASUARINÆ?

Macrosila casuarinæ, Walker, Lep. Het. viii. p. 210. n. 19 (1856).

"M. Saqueir," Larat.

The specimen is so much rubbed that it is impossible to be sure that it is the same as the Australian species.

CATEPHIIDÆ.

17. ERCHEIA DUBIA.

Catephia dubia, Butler, Cist. Ent. i. p. 292 (1874).

Larat.

One worn example of this Australian species was obtained.

OPHIUSIDÆ.

18. LAGOPTERA HONESTA.

Thyas honesta, Hübner, Samml. exot. Schmett. ii. Lep. iv., Noct. iii., Semigeometræ v., Meropides A, Festivæ 1, figs. 1, 2 (1805).

♀. Larat.

URANIIDÆ.

19. LYSSIDIA GOLDIEI.

Lyssidia goldiei, Druce, P. Z. S. 1882, p. 781.

Larat.

HYPÆNIDÆ.

20. PINACIA MOLYBDÆNALIS.

Pinacia molybdænalis, Hübner, Samml. exot. Schmett., Zutr. p. 13. n. 218, figs. 435, 436.

Larat.

Previously known from Java and Borneo.

ASOPIIDÆ.

21. HYMENIA FASCIALIS.

Phalæna-Pyralis fascialis, Cramer, Pap. Exot. iv. pl. 398. O (1782).

Larat.

A fragment of this wide-ranging species was obtained.

BOTIDIDÆ.

22. BOTYS, sp.

A broken example of a species allied to *B. gastralis*, which it resembles in size and coloration; the pattern, however, agrees better with *B. rosinalis*.

Ritabel, Larat.

The specimen is not sufficiently perfect to name; it is chiefly interesting for its resemblance to New-World types.

The only other Lepidopteron is unrecognizable, as previously mentioned; the veining of the wings reminds one of some Micro-Lepidopteron.

EXPLANATION OF PLATE XXXVIII.

Fig. 1. *Calliplœa visenda*, upperside, p. 367.
2. *Terias maroensis*, upper- and underside, p. 368.
3. —— *laratensis*, upper- and underside, p. 369.
4. *Hypolimnas forbesii*, upperside, p. 367.
5. *Salatura laratensis*, underside, p. 367.
6. *Delias timorensis*, underside, p. 368.
7. *Chanapa sacerdos*, upperside, p. 366.

4. Descriptions of new Species of Zygænidæ and Arctiidæ.

By Herbert Druce, F.L.S., F.Z.S., &c.

[Received April 30, 1883.]

(Plates XXXIX. & XL.)

The following descriptions are all taken from specimens in my own collection, mostly collected in Ecuador by Mr. C. Buckley, to which are added a few others that I have found undescribed in working through this group of the Heterocera for the purpose of making out the Central-American species for the 'Biologia.' Many of the species of Zygænidæ are the most wonderful of all the Moths; in some cases they so closely resemble Hymenoptera, that at first sight it is almost impossible to determine to which order they belong. In the present paper I have described fifty new species, representing twenty-four genera.

Fam. ZYGÆNIDÆ.

Eupyra, Herrich-Schäffer.

Eupyra herodes, n. sp. (Plate XXXIX. fig. 1.)

Wings uniform greenish black, slightly metallic along the costal margin of the primaries, a large hyaline patch crossed by the black veins close to the apex: head and thorax black; abdomen greenish; antennæ black, tipped with white; legs black; tarsi white.

Expanse 1½ inch.

Hab. Ecuador, Sarayacu (*Buckley*).

This peculiar species is very unlike any other that I am acquainted with, and may at some future time prove to be a new genus; but as I have only seen a single specimen, I think for the present it is better placed in the genus *Eupyra*.

Eupyra salmoni, n. sp.

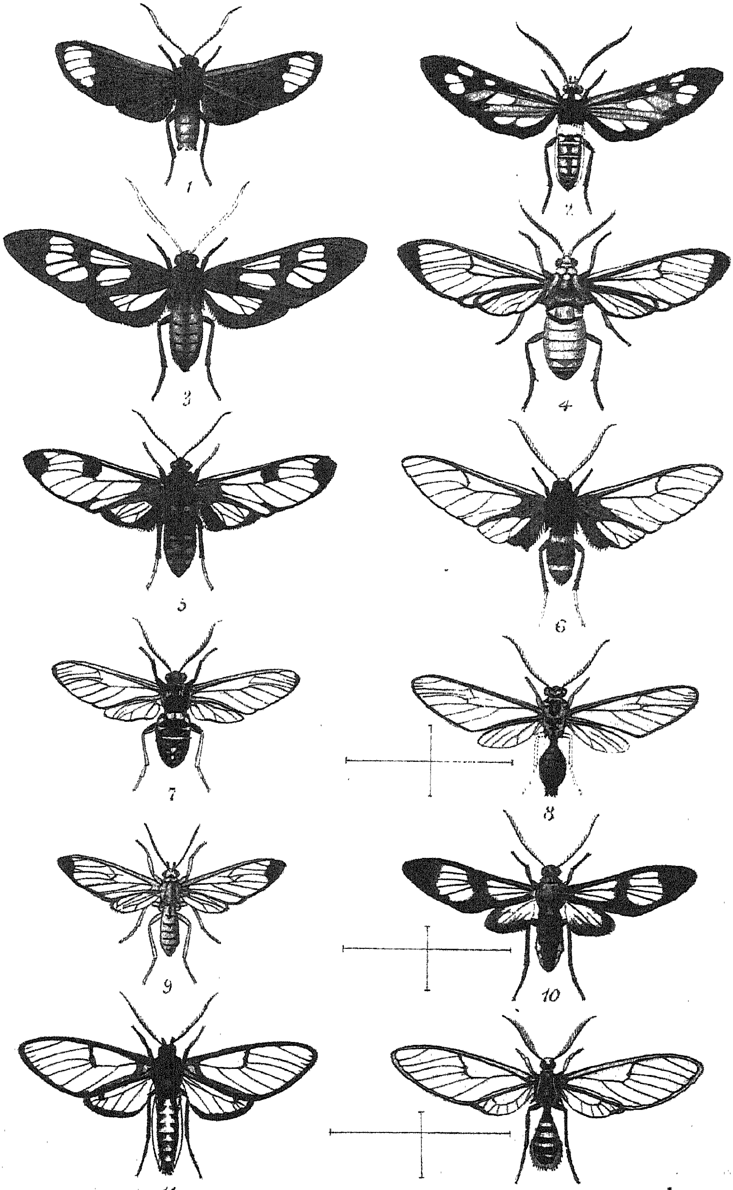
Primaries brownish black, thickly speckled with bright metallic green scales; four round hyaline spots, the first pair within the discoidal area, the second beyond and nearer the apex: secondaries black, with two elongated hyaline spots close to the base, and a round one beyond nearer the outer margin: head and thorax black; abdomen green, with a central black line; a white spot on the crown of the thorax, and one on each side of the abdomen close to the base; underside of abdomen white; legs white; tarsi black; antennæ black, slightly whitish at the tips.

Expanse 2 inches.

Hab. Colombia, Antioqua, Frontino (*Salmon*).

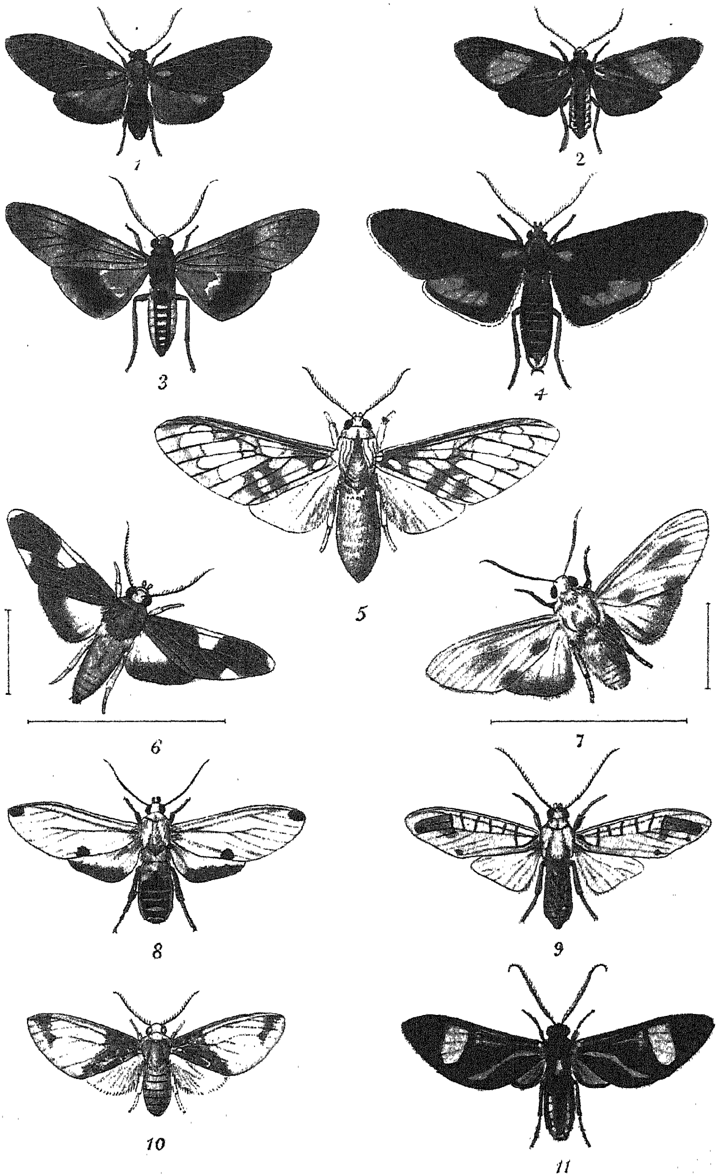
Eupyra cephalena, n. sp. (Plate XXXIX. fig. 2.)

Wings black; primaries thickly powdered with bright green scales, a band of hyaline spots close to the apex, a small spot at the end of



W. Purkiss lith.
Hanhart imp.

NEW ZYGÆNIDÆ.



W.Purkiss lith.
Hanhart imp.

NEW ZYGÆNIDÆ & ARCTIIDÆ.

the cell and one below nearer the base; secondaries hyaline, the outer and inner margin broadly black: head and thorax black; abdomen bright greenish blue, the base and sides of abdomen white; legs black; antennæ black.

Expanse 1¾ inch.

Hab. Ecuador, Sarayacu (*Buckley*); Colombia, Antioqua (*Salmon*).

A beautiful species, allied to *E. salmoni*. The specimens from Antioqua are rather more highly coloured than the type.

CALONOTOS, Hübner.

CALONOTOS SANDION, n. sp.

Wings hyaline; primaries—the costal apex, outer and inner margins broadly black; a wide black band crossing the wing from the costal margin to near the anal angle; the veins all black: secondaries black, the base and a small spot near the apex hyaline: head, antennæ, and thorax black; abdomen greenish black, the sides greenish white; legs black.

Expanse 2 inches.

Hab. Colombia, Ecuador, Sarayacu (*Buckley*).

Of this fine species I have only received a single specimen; it is allied to *C. almon*, Cramer.

CALONOTOS FLAVICORNIS, n. sp. (Plate XXXIX. fig. 3.)

Wings black; primaries crossed by two hyaline bands, the first about the middle, the second beyond nearer the apex, the nerves all black; secondaries hyaline, the inner and outer margins broadly black: head and thorax black; abdomen bright greenish blue; legs black; antennæ pale chrome-yellow.

Expanse 2 inches.

Hab. Colombia, Antioqua (*Salmon*).

A beautiful species, easily distinguished from all others by its pale yellow antennæ. I have also specimens of it from Ecuador sent by Mr. Buckley.

ISANTHRENE, Hübner.

ISANTHRENE EUSEBIA, n. sp.

Wings hyaline; primaries shaded with rich orange-yellow at the base and along the costal and inner margins, the outer margin and veins black, widened at the apex into a black spot; secondaries with the outer margin slightly black, widest at the anal angle: body yellow, banded with bluish black, the bands almost divided in the middle, forming spots; antennæ black, slightly yellowish at the tips; legs yellow.

Expanse 1½ inch.

Hab. Ecuador, Sarayacu (*Buckley*).

This beautiful species comes nearest *Isanthrene craboniformis*, Staudinger.

Isanthrene thyestes, n. sp. (Plate XXXIX. fig. 4.)

Wings hyaline, with the veins and outer margins black; head and thorax brownish black banded with yellow; abdomen yellow, crossed close to the base by a black band, the three last segments bright carmine; antennæ, legs, and underside of abdomen carmine, also the costal margin of the primaries.

Expanse $1\frac{3}{4}$ inch.

Hab. Ecuador, St. Lucia (*Wolf*).

This fine species is quite distinct from any that I am acquainted with, and has not any near ally.

Isanthrene tolosa, n. sp.

Wings hyaline; primaries with the costal and inner margins yellowish brown, outer margin and veins all black; secondaries with the outer margin black: head and front of thorax dark blue; thorax black; abdomen black, crossed at the base with a cream-coloured band; in some lights the abdomen is shot with bright blue; antennæ black at the base, brownish yellow near the tip.

Expanse $1\frac{1}{2}$ inch.

Hab. Ecuador, Intaj (*Buckley*).

This species resembles *Gymnelia completa*, Walker, to some extent, the black outer margins of the wings being very much narrower.

Homœocera, Felder.

Homœocera ozora, n. sp. (Plate XXXIX. fig. 6.)

Wings hyaline, the base, outer margin, and veins black; head, thorax, and abdomen greenish black, the abdomen crossed by two orange-red bands, the first close to the base, the second beyond the middle; antennæ black, tipped with white.

Expanse $1\frac{1}{2}$ inch.

Hab. Colombia, Antioqua (*Salmon*).

This beautiful species is closely allied to *Homœocera cressa*, Felder, from which it differs chiefly in the bands across the abdomen.

Homœocera buckleyi, n. sp. (Plate XXXIX. fig. 5.)

Wings hyaline; primaries—the base, a large square-shaped spot at the end of the cell, the apex, and a small spot close to the anal angle, the nerves, and outer margin all black; two small white spots close to the base: secondaries—the outer and inner margins black: head, thorax, and abdomen greenish black, two orange-red spots bordered with white on the inner side close to the base of the thorax, and a row of orange-red spots on each side; antennæ black, whitish at the tips; legs black; tarsi white.

Expanse $1\frac{3}{4}$ inch.

Hab. Ecuador, Intaj (*Buckley*).

This fine species is very distinct from any described, differing from all that I am acquainted with.

HOMŒOCERA LYRCEA, n. sp.

Wings pale hyaline, yellowish at the base, veins all black, the apex of the primaries slightly black; head and thorax black, spotted with yellow; abdomen black, banded with blue and yellow; antennæ black; legs yellow.

Expanse $1\frac{1}{2}$ inch.

Hab. Ecuador, Intaj (*Buckley*).

This species resembles to some extent *Homœocera ozora*, but is very distinct, the colour of the body being quite different.

ERRUCA, Walker.

ERRUCA LYCOPOLIS, n. sp. (Plate XXXIX. fig. 7.)

Wings yellowish hyaline; primaries with the costal and inner margins pale yellow, the veins all yellow, except close to the outer margin they are slightly dusky, all the outer margins slightly bordered with black: head and thorax black, spotted with blue; abdomen black, banded with yellow, and a series of blue spots down the middle enclosing two small yellow dots; antennæ yellow, rather dusky at the base.

Expanse $1\frac{3}{10}$ inch.

Hab. Ecuador, Sarayacu (*Buckley*).

ERRUCA PHYLEIS, n. sp.

Wings hyaline; primaries with the costal half rich golden yellow, the outer margin slightly bordered with brown; secondaries—the outer margin black, widest at the anal angle: head, thorax, and abdomen brownish black, a narrow cream-coloured band crossing the abdomen near the base of the thorax, and a bluish-grey line on each side; antennæ yellow; legs black, with the tarsi light yellow.

Expanse $1\frac{3}{4}$ inch.

Hab. Ecuador, Sarayacu (*Buckley*).

This species is allied to *Erruca aterrima*, Walker, but can easily be distinguished from that species by the much narrower black margins to all the wings and the yellow on the primaries.

ERRUCA SEPHELA, n. sp.

Wings yellowish hyaline; primaries—the costal and inner margins yellow, the outer margin black, widest at the apex; secondaries—the outer margin black, the inner margin yellow: head, thorax, and abdomen yellow, banded with black; antennæ and legs yellow.

Expanse $1\frac{1}{4}$ inch.

Hab. Ecuador, Sarayacu (*Buckley*).

This species is most nearly allied to *Erruca hilaris*, Walker, but is very distinct.

SPHECOSOMA, Butler.

SPHECOSOMA SURRENTUM, n. sp. (Plate XXXIX. fig. 8.)

Wings dusky hyaline, outer margins and veins all black; head and thorax yellow spotted with black; abdomen black; antennæ dark brownish black.

Expanse 1 inch.

Hab. Bolivia (*Buckley*).

This species resembles *Sphecosoma testaceum*, Walker, to some extent, but the black body clearly separates it from that species.

SPHECOSOMA ECUADORA, n. sp.

Wings hyaline; the costal margin of primaries red, extending almost to the apex, which is black; outer and inner margins very narrowly bordered with black: secondaries—the base pale yellow, the inner and outer margins slightly dusky: head, antennæ, front of thorax, and abdomen black; the base of thorax and three first segments banded with yellow; legs pale yellow; tarsi black.

Expanse $\frac{3}{4}$ inch.

Hab. Ecuador, Sarayacu (*Buckley*).

A small species allied to *Sphecosoma angustata*, Möschler.

LOXOPHLEBIA, Butler.

LOXOPHLEBIA EUMELIS, n. sp.

Wings yellowish hyaline; costal base and inner margin yellow; nerves black; outer margin black, widest at the apex: head, thorax, and abdomen black; a blue dot on the front of the head, and one at the base of the thorax; a central row of blue spots on each segment, and a row on each side of the abdomen; underside blue; antennæ black, finely pectinated.

Expanse $1\frac{1}{4}$ inch.

Hab. Ecuador, Intaj (*Buckley*).

LOXOPHLEBIA PETOSIRIS, n. sp.

Wings hyaline; base of primaries and inner margin of secondaries bright yellow; outer margin of all the wings narrowly bordered with black; apex of primaries broadly bordered with black: head and thorax black; abdomen yellow, banded with black, the three last segments shot with blue; antennæ black; legs bright yellow.

Expanse $1\frac{3}{10}$ inch.

Hab. Ecuador, Intaj (*Buckley*).

GYMNELIA, Walker.

GYMNELIA WHITELYI, n. sp.

This species is allied to *Gymnelia completa*, Walker, but differs from it in the following respects:—the marginal black bands are very much wider; the two cream-coloured spots are formed into a wide band at the base of the thorax; a series of narrow red bands cross the abdomen; and the anus is black instead of orange-red.

Expanse $1\frac{1}{2}$ inch.

Hab. East Peru (*Whitely*).

GYMNELIA TORQUATUS, n. sp.

Wings hyaline: primaries black for one third of length from the base; costal, outer, and inner margins black; apex broadly black; veins all black: secondaries black at the base, also the inner and outer margins: head, thorax, and basal half of the abdomen black, the anal half bright scarlet; antennæ black, tipped with white; legs black; tarsi spotted with white.

Expanse 2 inches.

Hab. South-east Brazil, Petropolis.

This fine species to some extent resembles *Dasysphinx mucescens*, Felder; it is much the largest species in the genus. I am indebted to Lord Walsingham for this interesting addition to my collection.

COSMOSOMA, Hübner.

COSMOSOMA OMOLE, n. sp.

Wings hyaline; primaries the same as in *C. confine*, Her.-Schäf., except that they are black at the base instead of orange-red; secondaries yellow on the inner margin, but in all other respects the same as *C. confine*: head and front of thorax black; abdomen bright yellow, the last three segments brilliant bluish green; antennæ black; legs yellow; tarsi black.

Expanse 1 inch.

Hab. Ecuador, Sarayacu (*Buckley*).

This species is allied to *C. confine*, the wings being very much the same, the great difference being the yellow abdomen, instead of blue spotted with red.

COSMOSOMA UFENTINA, n. sp.

Allied to *C. auge*, but the primaries rather longer and the black outer margin much wider; head black; thorax and abdomen yellow instead of bright red; the blue markings the same as in *C. auge*; antennæ black, the tips white; legs black.

Expanse $1\frac{3}{4}$ inch.

Hab. Bolivia (*Buckley*).

This is a very distinct species, allied to *C. auge*, Linn.

DYCLADIA, Felder.

DYCLADIA FELDERI, n. sp. (Plate XXXIX. fig. 9.)

Wings hyaline; primaries with the apex black, slightly yellow at the base; head, thorax, and abdomen pale sulphur-yellow; a central row of minute black spots commencing close to the thorax and terminating near the anus; antennæ black; legs pale yellow.

Expanse $1\frac{1}{10}$ inch.

Hab. Ecuador, Intaj (*Buckley*).

This species is allied to *Dycladia batesii*, Butler, from which it differs greatly in colour and extent of the black at the apex of the primaries. Specimens have lately been received from Mr. Champion, who obtained them in Guatemala.

Dycladia vindonissa, n. sp.

Wings sooty black; primaries hyaline from the base to the end of the cell; secondaries slightly hyaline at the base: head and antennæ black; thorax and basal half of the abdomen bright scarlet, the lower half on the upperside black, a series of small white spots on each side and several at the base; legs black.

Expanse $1\frac{1}{4}$ inch.

Hab. Ecuador, Sarayacu (*Buckley*).

Dycladia cretheis, n. sp.

Wings black; primaries hyaline from the base to beyond the end of the cell, the costal and inner margins black; secondaries black, excepting the cell, which is slightly hyaline: head and antennæ black; thorax and the first segment of abdomen bright scarlet; abdomen black shot with bluish green; underside of thorax and legs black.

Expanse 1 inch.

Hab. Ecuador, Sarayacu (*Buckley*).

This species is allied to *D. militaris*, Butler, but without the black band crossing the primaries; it is easily distinguished from that species by its bright scarlet thorax.

Dycladia chalonitis, n. sp. (Plate XXXIX. fig. 10.)

Wings hyaline; primaries the same as in *D. varipe*, but not shaded with yellow as in that species; secondaries with the outer margin black: head, antennæ, thorax, and abdomen black; a red spot on each side of the thorax and one at the base of the abdomen; a row of greenish spots on the side of the abdomen, almost forming bands close to the anus; underside dusky white; legs all black.

Expanse 1 inch.

Hab. Ecuador, Sarayacu (*Buckley*).

This species resembles *D. varipe*, Walker, in pattern, but is very different in colour.

DESMIDOCNEMIS, Moschler.

Desmidocnemis asmodeus, n. sp.

Wings yellowish hyaline; primaries with the base and outer margin slightly black; the inner margin of secondaries yellow: head, thorax, and abdomen black; anus yellow; antennæ black.

Expanse $1\frac{1}{4}$ inch.

Hab. Ecuador, Sarayacu (*Buckley*).

Desmidocnemis eumonides, n. sp.

Wings white hyaline; base, costal, outer, and inner margins black; a black band at the end of the cell, a small black spot below the cell near the inner margin: head, thorax, and abdomen black; antennæ black.

Expanse $1\frac{1}{10}$ inch.

Hab. Ecuador, Chiguinda (*Buckley*).

A beautiful little species, not nearly allied to any that I am acquainted with.

EUNOMIA, Hübner.

EUNOMIA OCINA, n. sp. (Plate XXXIX. fig. 11.)

Wings hyaline; the outer margins all black, the base of the primaries brilliant metallic blue, shading into black; a black band at the end of the cell; the outer margin of the secondaries very narrow: head, thorax, and antennæ black; abdomen above bright metallic blue, with a central row of white spots; the underside white; anus bright scarlet; legs black; tarsi white on the inner side.

Expanse $1\frac{3}{4}$ inch.

Hab. Bolivia (*Buckley*).

This beautiful species is very distinct from any described, but is allied to *E. eburneifera*, Felder, from which it differs in its larger size, narrow black margins of the wings, black thorax, and by wanting the blue at the base of the secondaries.

ARGYROEIDES, Butler.

ARGYROEIDES BOLIVIANA, n. sp. (Plate XXXIX. fig. 12.)

Wings hyaline, yellowish at the base of the primaries; nerves and outer margins black: head, thorax, and antennæ black; abdomen yellow banded with black; anus bright scarlet; legs yellow.

Expanse 1 inch.

Hab. Bolivia (*Buckley*).

A beautiful little species, very distinct from *A. ophion*, Walker.

PEZAPTERA, Butler.

PEZAPTERA CARMANIA, n. sp.

Wings hyaline; primaries—the apex and inner margin broadly black; secondaries—the outer margin black, widest at the anal angle: head, thorax, and abdomen above black, on the underside dusky white; antennæ black, tipped with white; legs black.

Expanse 1 inch.

Hab. Ecuador, Sarayacu (*Buckley*).

A small species, allied to *P. sordida*, Walker.

TRICHURA, Hübner.

TRICHURA HADASSA, n. sp.

Wings yellowish hyaline; the outer and inner margins narrowly bordered with black: head, thorax, and abdomen black, spotted and streaked with green; antennæ and legs black; the underside of abdomen with a double row of white spots.

Expanse $1\frac{3}{4}$ inch.

Hab. Ecuador, Intaj (*Buckley*).

This species closely resembles *T. aurifera*, Butler, the great difference being that all the yellow markings of that species are bright metallic green in the one now described as in *T. esmeralda*.

CHLOROPSINUS, Butler.

CHLOROPSINUS VIRIDIS, n. sp.

Wings uniform greenish brown, with all the veins black; head, antennæ, and thorax black; abdomen greenish black; legs black; tarsi white on the inner side.

Expanse 1½ inch.

Hab. Ecuador, Chiguinda (*Buckley*).

ILLIPULA, Walker.

ILLIPULA ORNATA, n. sp.

Primaries dark metallic green shaded with black, the apex and outer margin black; secondaries black: head, thorax, and abdomen bronze green, a row of four white spots on each side of the abdomen; antennæ and legs greenish black.

Expanse 2 inches.

Hab. Ecuador, Intaj (*Buckley*).

This species resembles *Mastigocera cyanea*, Butler.

Fam. ARCTIIDÆ.

CHARIDEA, Dalman.

CHARIDEA CLEASA, n. sp. (Plate XL. fig. 3.)

Primaries black, shot with dull green at the base; secondaries black, the base bright morpho blue, the outer margin slightly tinted with carmine: underside of primaries black, crossed beyond the middle with a bright carmine band; secondaries black, the base shot with green, the apex and outer margin broadly banded with carmine: head and front of thorax bright green; thorax black; abdomen on the upperside dark blue, on the underside bright carmine; antennæ and legs black.

Expanse 1½ inch.

Hab. Colombia, Bogota (*Chesterton*).

This very beautiful species is allied to *C. quadricolor*, Felder, but is very distinct.

CHARIDEA IMPERIALIS, n. sp. (Plate XL. fig. 2.)

Primaries black, shot with bluish green at the base, a large central scarlet band crossing the wing from the costal margin to the anal angle; secondaries deep blue, the outer margin and apex black: head, thorax, and abdomen metallic blue; antennæ and legs black: underside the same as above.

Expanse 1 inch.

Hab. Ecuador, Chiguinda (*Buckley*).

A beautiful species, belonging to the *Eucyane* group of *Charidea*.

CHARIDEA JULIA, n. sp.

Primaries black, shot with bright blue at the base, a rose-coloured band crossing the wings from the costal margin to the anal angle; secondaries bright blue, the apex slightly black: head, thorax, and abdomen black shot with blue; antennæ and legs black.

Expanse $1\frac{1}{2}$ inch.

Hab. East Peru, Chanchamayo (*H. Whitely*).

A beautiful species, allied to *C. imperialis*.

CHARIDEA BUCKLEYI, n. sp. (Plate XL. fig. 4.)

Primaries rich brown, a red spot and a few green dots close to the base, the fringe pale yellow; secondaries blackish brown, crossed from the apex to near the inner margin by a carmine band divided into spots by the black nerves, the fringe yellow; head, thorax, and abdomen black; the abdomen crossed by a series of bright green bands; antennæ and legs black; the underside the same as above, with the addition of a red spot at the end of the cell of the primaries. The female the same as the male, only with more red on the hind wings.

Expanse 2 inches.

Hab. Ecuador, Sarayacu (*Buckley*).

A very distinct species, not nearly allied to any with which I am acquainted.

CHARIDEA BERTHA, n. sp. (Plate XL. fig. 1.)

Primaries brown, with a small red streak at the base; secondaries deep blue, the outer margin shaded with brown, a large carmine spot on the costal margin close to the apex: head, thorax, antennæ, and legs black banded with bright green; underside brown, both wings crossed by a central carmine band, the base slightly blue. The female only differs from the male in having more red on the hind wing.

Expanse $1\frac{3}{8}$ inch.

Hab. Ecuador, Sarayacu (*Buckley*).

CHARIDEA PERILLA, n. sp.

Primaries brown, a red spot at the base, and one beyond the cell near the apex; secondaries bright carmine, the outer and inner margins dark brown: head and thorax black shaded with blue; abdomen bright blue; underside brown; underside of wings bright carmine, slightly margined with brown.

Expanse $1\frac{3}{8}$ inch.

Hab. Ecuador, Sarayacu (*Buckley*).

This species is allied to *C. bertha*, but differs from it and all species known to me.

CHARIDEA CHLOE, n. sp.

Primaries brown, the fringe yellow; secondaries brown, with a small red spot close to the apex; the fringe yellow: underside the same as above, except that all the wings are shot with green close to the base; head, thorax, and abdomen black, spotted and banded with bright green.

Expanse $1\frac{3}{8}$ inch.

Hab. Ecuador, Chiguinda (*Buckley*).

This species is allied to *C. bertha.*

DIABÆNA, Felder.

DIABÆNA IMITATA, n. sp.

This species closely resembles *D. cincticollis*, Felder; the primaries are the same; the secondaries are bright orange bordered with brown instead of white as in Felder's species; in other respects it does not differ.

Expanse $1\frac{1}{4}$ inch.

Hab. Ecuador, Chiguinda (*Buckley*).

AUTOMOLIS, Hübner.

AUTOMOLIS SUPERBA, n. sp. (Plate XL. fig. 8.)

Primaries bright chrome-yellow, a small black spot at the apex, and one on the inner margin close to the anal angle; secondaries chrome-yellow, the abdominal margin deep yellow, the outer margin broadly black; head and underside of thorax black shot with greenish scales; thorax yellow; abdomen deep orange at the base, the lower half black banded with bright blue; the underside bright orange; antennæ and legs black.

Expanse $1\frac{6}{10}$ inch.

Hab. Ecuador, Sarayacu (*Buckley*).

This species is very distinct from any described, but comes nearest *A. ameoides*, Butler.

AUTOMOLIS ASARA, n. sp. (Plate XL. fig. 7.)

Primaries dusky yellow; a brown spot near the base on the inner margin, and a slight spot at the anal angle extending to near the cell; secondaries yellowish white, the outer margin pale brown: head, thorax, and abdomen yellow; antennæ yellow at the base, and tip black in the middle; legs yellow; tarsi spotted with black.

Expanse $1\frac{1}{4}$ inch.

Hab. Ecuador, Sarayacu (*Buckley*).

ANDROCHARTA, Felder.

ANDROCHARTA CASSOTIS, n. sp. (Plate XL. fig. 11.)

Primaries rich dark brown; a slender carmine streak in the cell, and one from the base to near the anal angle; a wide oblique orange band near the apex; a small metallic blue spot at the end of the cell; secondaries very small, dark brown; head, thorax, and abdomen black; the sides of the abdomen spotted with metallic blue; antennæ black.

Expanse $1\frac{7}{10}$ inch.

Hab. Ecuador, Sarayacu (*Buckley*)

This species imitates *Histræa amazonica,* Butler, on the primaries, but the very small secondaries at once show that it is an *Androcharta.*

Evius, Walker.

Evius polyxenus, n. sp. (Plate XL. fig. 6.)

Primaries reddish brown, a large V-shaped spot on the costal margin, a small one at the apex, and one on the hind margin yellow; secondaries yellow, the outer margin broadly brown: head yellow; thorax brown; abdomen brick-red; antennæ brown, yellow at the tips.

Expanse $1\frac{1}{4}$ inch.

Hab. Ecuador, Sarayacu (*Buckley*).

Zatrephes, Hübner.

Zatrephes chaon, n. sp. (Plate XL. fig. 10.)

Primaries pale chrome-yellow; the base, inner margin, and apex red; a patch of metallic silver extending from the base along the inner margin; secondaries pale yellowish white shot with pink: head yellow; thorax and abdomen brownish red; antennæ and legs red.

Expanse $1\frac{1}{2}$ inch.

Hab. Ecuador, Sarayacu (*Buckley*).

This beautiful species is allied to *Z. trailii,* Butler.

Zatrephes grandis, n. sp. (Plate XL. fig. 5.)

Primaries orange-red, shaded with brown; a white spot at the base, and one below on the inner margin, a yellowish hyaline spot at the end of the cell, and an irregular hyaline band crossing from the costal margin near the apex to the anal angle; veins all black; secondaries yellowish hyaline, shaded with red on the inner margin: head, thorax, and abdomen orange-red; antennæ brown; legs red.

Expanse $2\frac{1}{2}$ inches.

Hab. Ecuador, Intaj (*Buckley*).

Zatrephes buckleyi, n. sp. (Plate XL. fig. 9.)

Primaries bright orange-yellow, crossed from the costal margin nearly to the middle by three bands of pale chrome-yellow edged with black; an elongated slate-coloured patch at the end of the cell extending nearly to the outer margin; a small black spot at the anal angle; secondaries pinkish white: head, thorax, and abdomen orange-yellow; antennæ and legs brown.

Expanse $1\frac{3}{4}$ inch.

Hab. Ecuador, Sarayacu (*Buckley*).

I have named this beautiful species after Mr. Buckley, being one of the many new species taken by him.

Hoplarctia, Butler.

Hoplarctia claria, n. sp.

Primaries brownish black; a longitudinal streak from the base through the cell to near the outer margin pale cream-colour; the inner margin and the fringe cream-colour; secondaries pale buff, in some specimens almost white, with the outer margin brownish black: head and thorax black; abdomen dark bluish green; antennæ black; legs metallic green.

Expanse 1½ inch.

Hab. Ecuador, Chiguinda (*Buckley*).

This species is closely allied to *H. nantana*, Walker, its chief difference being the colour of the secondaries. I have a good series of specimens of both sexes before me; they do not show the faintest trace of carmine in the hind wings.

EXPLANATION OF THE PLATES.

Plate XXXIX.

Fig. 1. *Eupyra herodes*, p. 372.
2. —— *cephalena*, p. 372.
3. *Calonotos flavicornis*, p. 373.
4. *Isanthrene thyestes*, p. 374.
5. *Homœocera buckleyi*, p. 374.
6. —— *ozora*, p. 374.
Fig. 7. *Erruca lycopolis*, p. 375.
8. *Sphecosoma surrentum*, p. 375.
9. *Dycladia felderi*, p. 377.
10. —— *chalonitis*, p. 378.
11. *Eunomia ocina*, p. 379.
12. *Argyrocides boliviana*, p. 379.

Plate XL.

Fig. 1. *Charidea bertha*, p. 381.
2. —— *imperialis*, p. 380.
3. —— *cleasa*, p. 380.
4. —— *buckleyi*, p. 381.
5. *Zatrephes grandis*, p. 383.
6. *Evius polyxenus*, p. 383.
Fig. 7. *Automolis asara*, p. 382.
8. —— *superba*, p. 382.
9. *Zatrephes buckleyi*, p. 383.
10. —— *chaon*, p. 383.
11. *Androcharta cassotis*, p. 382.

5. Note on the Variation of certain Species of *Agrias*.

By F. D. Godman, F.R.S., and O. Salvin, F.R.S.

[Received May 5, 1883.]

Since writing our paper on *Agrias stuarti* (P. Z. S. 1882, p. 338, t. 19), Mr. A. Maxwell Stuart has again visited the Amazons, and at Yquitos, where he captured the original type, has succeeded in taking four more specimens, three males and one female, of this magnificent Butterfly, all of which he has most generously placed in our collection.

Noticing considerable variation in the series thus acquired, and hearing that Dr. Staudinger had also recently received two specimens from his excellent collector, Dr. Hahnel, from Pebas on the Amazons, we wrote to the former gentleman asking him if he would kindly allow us to see his specimens. These, together with two of *A. phalcidon*, which will be referred to below, he has most obligingly sent us. Thus, with the type of *A. beatifica* in the British Museum and the female described in our paper from our own collection, we have before us seven males and two females of these insects.

The characters on which we relied in separating *A. stuarti* from *A. beatifica* were the greater extent of the purplish-blue colour at the expense of the green on the upper surface, and the greater size of the black submarginal spots of the secondaries beneath. To this we may add that the blue of the primaries is almost uninterruptedly black, whereas in *A. beatifica* a nearly continuous black band extends across from the costa to the inner margin. These differences are entirely broken down by the series now before us.

One of Mr. Stuart's specimens has a broader green submarginal band than even the type of *A. beatifica*, another has still less than the type of *A. stuarti*, while the remaining specimens, including those of Dr. Staudinger, serve to link the whole series together. There are other points of variation to which it is necessary to allude. One of these refers to the innermost or first band of black spots on the secondaries beneath. In the type of *A. beatifica* and in one of the Pebas specimens they are clearly defined; in the other Pebas specimen they are entirely absent, while in the remaining Yquitos examples they appear to a variable extent. The colour of the base of the secondaries on the underside varies from Indian red to orange. Seeing, therefore, that no two of the series are alike, and that the two extremes of variation are found in insects flying in the same forest, we are compelled to alter our views as to the distinctness of *A. stuarti*, and to consider it but a variety of *A. beatifica*.

Respecting the habits of this insect, Mr. Stuart informs us that though he frequently observed this species in the forests of Yquitos, they were nowhere abundant, two specimens or so appropriating a limited portion of the forest to themselves. Their rapid and lofty flight is well known; but Mr. Stuart observed that they passed the same place about once only in every four hours during the day.

The synonymy of *A. beatifica* will now stand as follows:—

AGRIAS BEATIFICA.

Agrias beatifica, Hew. Equat. Lep. p. 30; Ex. Butt. iii. t. 2. f. 5, 6; Godm. & Salv. P. Z. S. 1882, p. 338, t. 19. f. 3, 4.

Agrias stuarti, Godm. & Salv. P. Z. S. 1882, p. 338, t. 19. f. 1, 2.

Hab. Ecuador, Sarayacu (*Buckley*); Upper Amazons, Yquitos (*A. M. Stuart*), Pebas (*Hauxwell* and *Hahnel*).

Mus. Brit., Godm. & Salv., Dr. O. Staudinger.

The two specimens of *A. phalcidon* already referred to as sent us by Dr. Staudinger are interesting as showing that a similar state of variation exists in this species as we have already stated is found in *A. beatifica*.

A. phalcidon was discovered at Villa Nova on the Lower Amazons by Mr. H. W. Bates during his memorable expedition. Seven specimens in the British Museum (including four in the Hewitson collection) and four in our own were all probably taken by Mr. Bates. The two examples in Dr. Staudinger's collection were captured by Dr. Hahnel at Villa Bella, a more recent name apparently than Villa Nova for the same village, which is situated on the south bank of the Amazons between the mouths of the Tapajos and Madeira rivers.

These eleven specimens are all males, and the green submarginal band in most of them is well defined, but in some it is wider than in others. In one of Dr. Staudinger's examples, however, this band is evanescent, and the rich blue of the upper surface of the wings almost reaches to the transverse spots which cross the apex of the wing. There is a black spot within the cell, but this colour does not extend beyond it as in more typical examples. Between this extreme example and the type, the specimens before us may be arranged so as to some extent to bridge the gap between them; but the series is not so complete as that of *A. beatifica* described above.

6. Report on a Collection of Reptiles and Batrachians from the Timor Laut Islands, formed by Mr. H. O. Forbes. By G. A. Boulenger, F.Z.S.

[Received April 30, 1883.]

(Plates XLI. & XLII.)

The Reptiles and Batrachians collected by Mr. Forbes in the Timor Laut Islands, and presented to the British Museum by the British Association, belong to 17 species, which, with the exception of two new to science, were already well known from different parts of the Austro-Malayan Subregion. The two new species are a Lizard of the Australian genus *Lophognathus*, Gray, and a Snake of the Indian genus *Simotes*, D. & B. The latter is the most remarkable discovery, as no species of this genus was known to occur eastwards of Java.

The following is a list of the species collected:—

REPTILIA.

LACERTILIA.

1. GECKO VERTICILLATUS, Laur.

2. PERIPIA MUTILATA (Wiegm.).

3. VARANUS INDICUS (Daud.).

4. ABLEPHARUS BOUTONII (Desj.) [*A. pœcilopleurus*, Wiegm.].

5. EUPREPES RUFESCENS (Shaw).

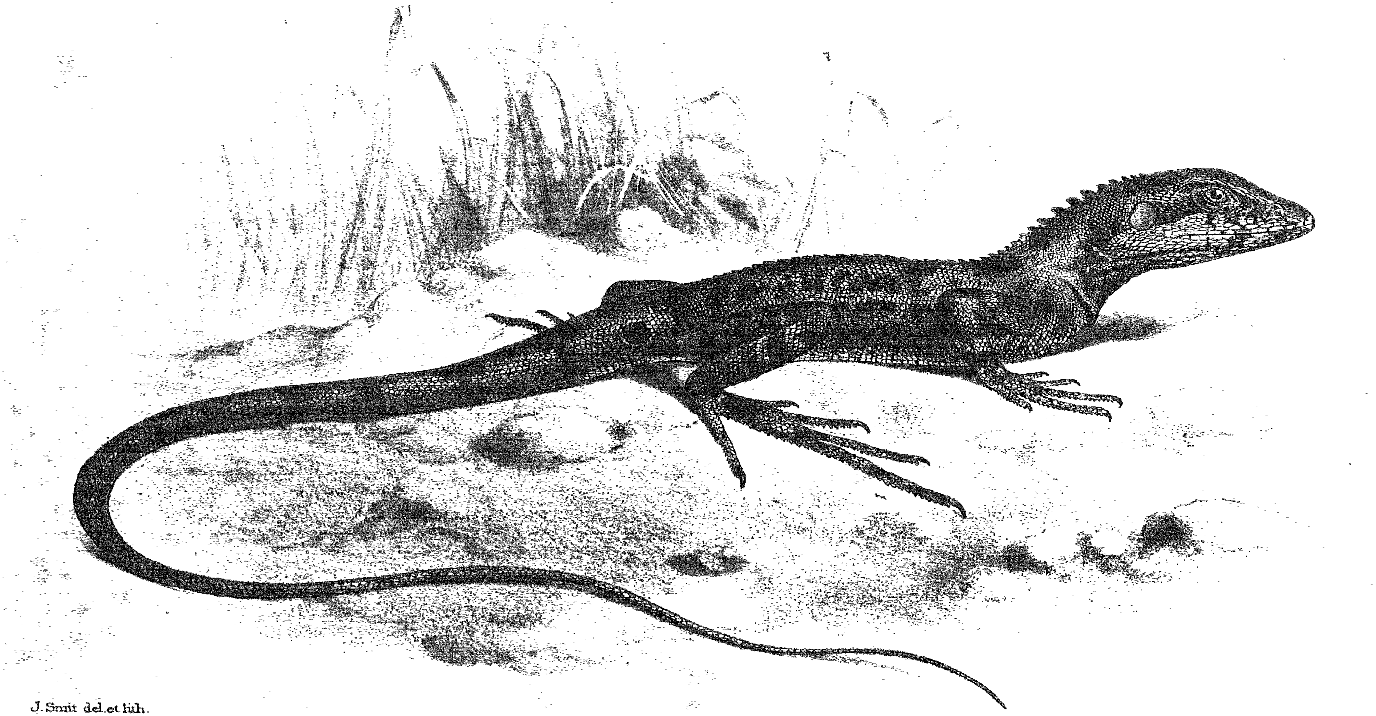
6. EUPREPES CYANURUS (Less.).

7. LYGOSOMA SMARAGDINUM (Less.).

8. BRONCHOCELA MOLUCCANA (Less.).

9. LOPHOGNATHUS MACULILABRIS, sp. n. (Plate XLI.)

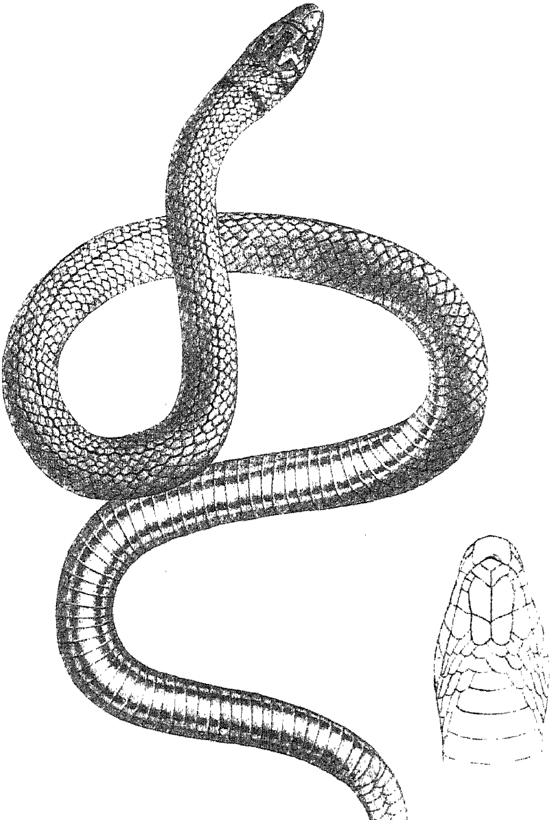
Snout obtuse, as long as the distance between the orbit and the posterior border of the ear. Nostril equally distant from the orbit



J. Smit del. et lith.

Mintern Bros. imp.

LOPHOGNATHUS MACULILABRIS.



R. Mintern del. et lith.   Mintern Bros. imp.

SIMOTES FORBESI.

and the tip of the snout. Upper surface of head covered with very strongly keeled scales. Dorsal scales small, the upper largest, strongly keeled, all obliquely directed upwards. Gular and ventral scales strongly keeled, the latter larger than the largest dorsal scales. No femoral or præanal pores. Upper surfaces olive, with blackish transverse markings across the back, tail, and limbs; upper surface of head with three obsolete blackish transverse bands, separated by light lines; a broad blackish band from orbit to tympanum, bordered inferiorly by a light band extending to above the fore limb; lips light-coloured, variegated with blackish; lower surfaces whitish, dotted all over with blackish.

Two specimens; the largest measures:—

	millim.
Total length	388
From tip of snout to vent	98
,, ,, fore limb	43
Length of head (to occiput)	22
Width of head	17
Fore limb	46
Hind limb	94
Tail	290

OPHIDIA.

10. PYTHON RETICULATUS (Schn.).

11. LIASIS AMETHYSTINUS (Schn.).

12. ENYGRUS CARINATUS (Schn.).

13. SIMOTES FORBESI, n. sp. (Plate XLII.)

Length of snout measuring twice the diameter of the eye. Nasal divided; loreal slightly higher than broad; one præ- and two postoculars; temporals 1+2; seven upper labials, the third and fourth entering the orbit; four inferior labials in contact with anterior chin-shields; latter, hinder pair three fifths the length of anterior pair. The portion of the rostral seen from above is as long as the suture between the internasals and the præfrontals; latter considerably higher than internasals. Frontal longer than its distance from the tip of the snout, as long as parietals. Scales in 17 rows. Ventrals slightly keeled on the sides, 155 or 165; anal entire; subcaudals 45. Upper surfaces greyish brown, the borders of the scales darker; head with the ordinary symmetrical dark markings; the inner border of the seventh longitudinal series of scales, counted on each side from the gastrosteges, darker, thus forming two fine vertebral lines separated from each other by three rows of scales; belly yellowish, each ventral shield with a brown spot near the lateral edge, these spots more or less confluent into a dark streak, separated from the dorsal brown colour by a pure yellowish streak of equal width; in one of the two specimens the ventrals become gradually entirely brown towards the posterior part of the body, except the lateral outer streak, which remains pure yellowish. Head and body 30½ centim.; tail 58 millim.

14. Dendrophis punctulatus (Gray).

15. Chrysopelea rhodopleuron (Reinw.).

BATRACHIA.

16. Rana papua, Less.

17. Hyla dolichopsis (Cope).

June 19, 1883.

Prof. Flower, LL.D., F.R.S., President, in the Chair.

The Secretary read the following report on the additions to the Society's Menagerie during the month of May 1883:—

The total number of registered additions to the Society's Menagerie during the month of May was 123, of which 48 were by presentation, 29 by purchase, 7 by birth, 1 by exchange, and 38 were received on deposit. The total number of departures during the same period, by death and removals, was 134.

The most noticeable additions during the month of May were as follows:—

1. A hen Cabot's Tragopan (*Ceriornis caboti*), from South-west China, purchased May 18th, being the first example of the female of this fine Pheasant which we have received.

2. Four Pygmy Hogs (*Porcula salvania*), born in the Gardens, May 23.

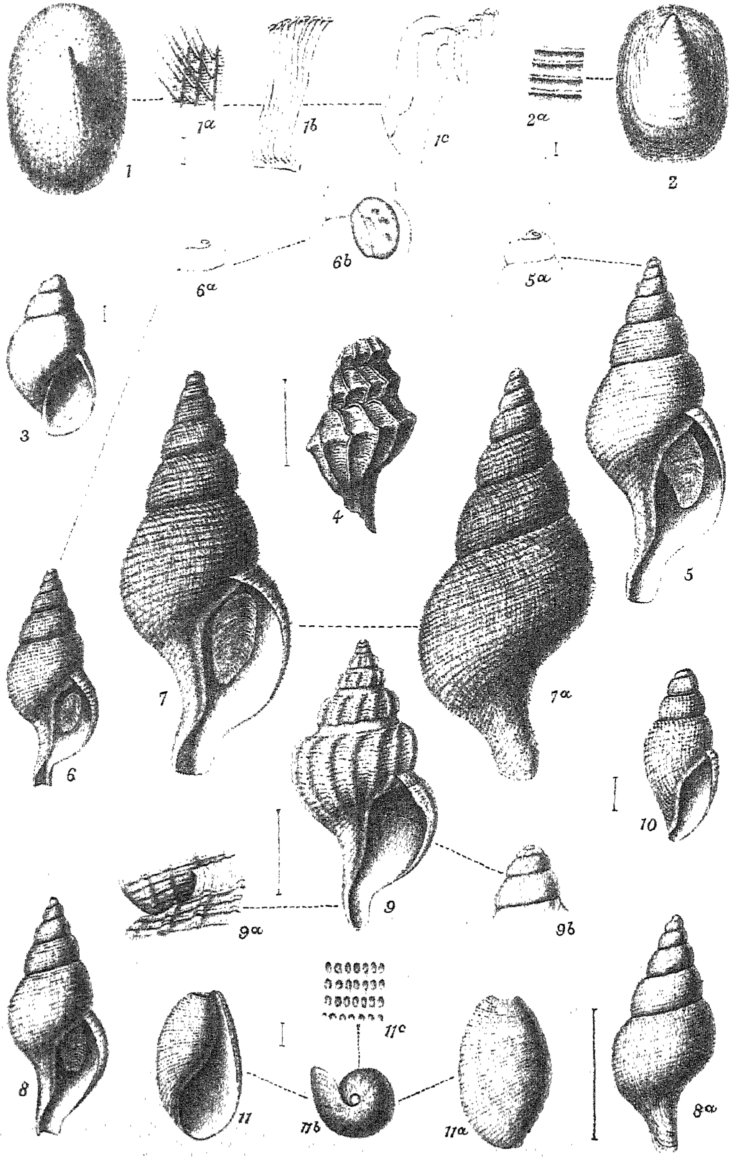
These diminutive Pigs, of which I exhibit a drawing of the natural size (Plate XLIII.), did not, unfortunately, survive their birth; but the fact of the species having bred in captivity is of great interest, and we may hope for better success on a future occasion, as although we have lost one of our specimens, which will be the subject of Dr. Garson's paper to-night, the others are alive and well.

3. A fine example of the Surucucu or Bush-master Snake of South America (*Lachesis mutus*), presented by Henry Y. Barkley, Esq., of Pernambuco, on the 22nd of May.

The following extract was read from a letter addressed to the Secretary by Mr. Albert A. C. Le Souëf, C.M.Z.S., dated Melbourne, April 18th, in which attention was called to a curious fact in connexion with the Satin Bower-bird (*Ptilonorhynchus holosericeus*):—

"I have frequently noticed in the hill-country east of Melbourne large flocks of the Satin Bower-bird, sometimes over a hundred together, but have hardly ever seen more than three or four black individuals, the rest being green; and it has always seemed singular to me that there should be such a small proportion of adult males.

"About eight years ago I caged a number of these interesting birds, eight or ten green and two black. The black birds died



C Berjeau del. et lith.

Hanhart imp.

MOLLUSCA COLLECTED DURING
THE CRUIZE OF H.M.S. "TRITON".

within two years; but most of the green ones are still living, and one of them has just changed its plumage. I first noticed the black feathers appearing about two months ago, and now it is altogether of a glossy blue-black, being, I suppose, about ten years old, but possibly more. This proves, I think, that only the very old cocks change their colour, and soon die off afterwards, which would account for the very few black cocks to be met with in the bush."

Remarking upon this, Mr. Sclater said that there was no doubt that these Bower-birds were a long time assuming the adult dress, but that male birds in full plumage had certainly lived for several years in the Society's Gardens.

Prof. E. Ray Lankester, F.R.S., read a memoir on the muscular and endoskeletal systems of *Limulus* and *Scorpio*, drawn up by himself with the assistance of his two pupils, Mr. W. J. Barham and Miss E. M. Beck. These investigations seemed to confirm Prof. Lankester's previously expressed views as to the near affinity of these two forms, hitherto usually referred to different classes of the animal kingdom, and to justify the association of *Limulus* with the Arachnida.

This paper will be printed entire in the Society's 'Transactions.'

The following papers were read:—

1. On the Mollusca procured during the Cruise of H.M.S. 'Triton' between the Hebrides and Faroes in 1882.

By J. GWYN JEFFREYS, LL.D, F.R.S., F.Z.S.

[Received June 10, 1883.]

(Plate XLIV.)

The sea-bed lying between the Hebrides and the Faroe Islands, or the submarine region now known as the "Faroe Channel," has been partially examined during the last few years for zoological and physical purposes.

In 1868 the first experimental or tentative expedition was made in one of our small Government steam-ships, to explore the deeper parts of the sea around our coasts; and the Surveying-ship 'Lightning' was assigned and equipped for that service. The expedition was placed under the scientific charge of Dr. Carpenter and the late Sir Wyville Thomson; and the results were given by Dr. Carpenter and published in the 'Proceedings of the Royal Society' for December 1868. In that short cruise, part of the submarine region above mentioned was described as the "Warm area," and another part as the "Cold area"—the bottom temperature of the former ranging from 46° to 50° F. and of the latter from 32° to 41°. Dr. Carpenter noticed that the Fauna inhabiting the "Warm" area was comparatively of a North-British type, and that of the "Cold" area more Scandinavian or Boreal. The depths examined in the cruise were from 60 to 650 fathoms.

In 1869 succeeded the Expedition in the Surveying steam-ship 'Porcupine;' and the third cruise in that year was devoted to the further examination of the "Faroe Channel." The Mollusca obtained during this cruise did not show so great a difference between the "warm" and "cold" areas as appeared to be the case in other departments of the Invertebrata.

During the following ten years took place the further and more extended cruises of the 'Porcupine,' and the Expeditions in H.M.S. 'Valorous' and 'Challenger,' all of which originated in the first mentioned cruise of the 'Lightning.'

In 1880, previous to the lamented death of Sir Wyville Thomson, the Government was induced on his application to grant the use of a hired ship, the 'Knight Errant,' for the reexamination of the Faroe Channel. The vessel was small and the weather bad; but some results were obtained, and communicated by Mr. John Murray, the naturalist in charge, to the Royal Society of Edinburgh, who published the account in their 'Proceedings.' I contributed a list of the Mollusca. Staff-Commander Tizard conducted this cruise as well as that in H.M.S. 'Triton'; he had been one of the officers in the 'Challenger' Expedition. Mr. Murray was one of the naturalists on board the 'Challenger,' and is well known for his admirable work on deep-sea deposits.

In 1882 the Government ordered the 'Triton,' a composite steamship of 410 tons, which was employed in the Surveying service, to resurvey and explore the sea-bed lying between 59 and 61 degrees of North Latitude, and especially the "Wyville-Thomson ridge," which was supposed to separate the "warm" from the "cold" area. Mr. Murray had also the scientific charge of this short cruise. It was made in August. The weather was, on this occasion also, bad; but the results as regards the Mollusca were most interesting, and include the discovery of several undescribed species.

The following is a list of the Stations with other particulars:—

No. of Station.	Lat. N.			Long. W.			Depth in faths.	Bottom Temperature.	Remarks.	Warm or cold area.
	°	′	″	°	′	″		° °		
1.	59	51	30	6	21		240	47·5–47·6	On the ridge.	
2.	59	37	30	6	21		530	46·2	West of ridge.	Warm.
3.	60	39	30	9	6		87	49·5	Faroe Banks.	
4.[1]	60	22	40	8	21		327–430	31·5–32·0	East of ridge.	Cold.
5.[2]	60	11	45	8	15		433	43·5	West of ridge.	Warm.
6.	60	9		7	16	30	466	29·5–30·0	East of ridge.	Cold.
7.	60	19		7	10		585	29·9–30·5	East of ridge.	Cold.
8.	60	18		6	15		640	30·0	East of ridge.	Cold.
9.	60	5		6	21		608	30·0	East of ridge.	Cold.
10.	59	40		7	21		516	46·0–46·5	West of ridge.	Warm.
11.	59	39	30	7	13		555	45·5	West of ridge.	Warm.
12.	60	31		7	34		580	31·0	East of ridge.	Cold.
13.	59	51	2	8	18		570	45·7	West of ridge.	Warm.

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[1] Partly on the ridge.

[2] The trawl had been carried right over the ridge and came up in the Cold area.

Besides the above stations, the trawl was used off the Butt of Lewis in 40 fathoms.

LIST OF MOLLUSCA.

Station 2. Warm area.

1. *Pecten sulcatus*, Müller.
2. *Amussium hoskynsi*, Forbes.

Both widely distributed in the North Atlantic and Mediterranean.

Station 3.

1. *Anomia patelliformis*, Linné.
2. *Pecten pusio*, L.
3. *Aporrhaïs serresianus*, Michaud.
4. *Fusus norvegicus*, Spengler.

The third is a southern, and the fourth a northern form.

Station 4. Cold area.

1. *Morvillia undata*, Brown.
2. *Buccinum hydrophanum*, Hancock.

Both Arctic species.

Station 8. Cold area.

1. *Leda frigida*, Torell.
2. *Leda tenuis*, Philippi.
3. *Leda subæquilatera*, Jeffreys.
4. *Neæra subtorta*, G. O. Sars.
5. *Natica affinis*, Gmelin.
6. *Cerithiopsis costulata*, Möller.
7. *Fusus islandicus*, Chemnitz.
8. *Fusus sabini*, Gray.
9. *Fusus delicatus*, Jeffr., n. sp.
10. *Fusus berniciensis*, King; var. *elegans*.
11. *Mohnia mohni*, Friele.
    See Nyt Mag. 1877; Jahrb. mal. Ges. 1878 & 1879; and Norske Nordhavs-Exped. 1882.
12. *Pleurotoma (Bela) scalaroïdes*, G. O. Sars.
13. *Pleurotoma scalaroïdes*, G. O. Sars; var. = *Bela scalaris*, G. O. Sars. Not *Defrancia scalaris*, Möller.
14. *Pleurotoma tenuicostata*, M. Sars.

From typical specimens of all these three species.

Mostly northern. Nos. 1 and 2 are generally distributed in the North Atlantic and Mediterranean. No. 10 ranges southwards to the Bay of Biscay.

Station 9. Cold area.

1. *Arca pectunculoïdes*, Scacchi; var. *septentrionalis*.
2. *Natica affinis*, Gm.
3. *Pilidium radiatum*, M. Sars.
4. *Fusus sabini*, Gray.

5. *Fusus delicatus*, Jeffr.
6. *Fusus turgidulus*, Jeffr.; Friele in der Norske Nordhavs-Expedition, 1882, p. 11, pl. i. f. 13–18, and pl. iv. f. 14–28; 223–649 fms., and 'Porcupine' Exp. 1869, 155–345 fms.
7. *Fusus concinnus*, Jeffr., n. sp.
8. *Fusus hirsutus*, Jeffr., n. sp.
9. *Fusus lachesis*, Mörch.
10. *Fusus islandicus*, Chemn.

All are either arctic or new species.

Station 10. Warm area.

1. *Anomia ephippium*, L.; var. *squamula*.
2. *Pecten vitreus*, Chemn.
3. *Idas argenteus*, Jeffr. See Proc. Zool. Soc. 1879, p. 570, and 1882, p. 683.
4. *Leda frigida*, Tor.
5. *Leda lucida*, Lov.
6. *Nucula corbuloïdes*, Seguenza.
7. *Nucula tumidula*, Malm.
8. *Limopsis minuta*, Ph.
9. *Limopsis cristata*, Jeffr.
10. *Scrobicularia alba*, W. Wood.
11. *Teredo norvegica*, Spengl.
12. *Teredo megotara*, Hanley.
13. *Cocculina spinigera*, Jeffr., sp. n.
14. *Cocculina corrugata*, Jeffr., sp. n.
15. *Odostomia electa*, Jeffr., sp. n.
16. *Natica montacuti*, Forb.
17. *Aporrhaïs serresianus*, Mich.
18. *Cerithium metula*, Lov.
19. *Columbella haliæeti*, Jeffr.

It now appears that *Fusus costulatus* of Cantraine, to which this species had been referred by Italian conchologists, as well as lately by myself, belongs to the genus *Pleurotoma*, together with his *Fusus semicostatus*. The former species is in all probability *P. striolata* of Scacchi, and the latter is certainly (from Cantraine's type) *P. maravignæ* of Bivona. The type of Cantraine's *Fusus costulatus* has been unfortunately lost. Under these circumstances I must retain my name *haliæeti*. *Buccinum acutecostatum* of Philippi = *B. testæ* of Aradas is allied to the present species; but it is not, in my opinion, identical with *C. haliæeti*.

20. *Cylichna alba*, Brown.

All these species, except the last and those which are new, have an extensive range in the North Atlantic.

Station 13. Warm area.

1. *Amussium hoskynsi*, Forb.
2. *Lima subauriculata*, Montagu.
3. *Lima subovata*, Jeffr.

4. *Leda lucida*, Lov.
5. *Arca pectunculoïdes*, Sc.; var. *septentrionalis*.
6. *Nucula tumidula*, Malm.
7. *Dacrydium vitreum*, Tor.
8. *Dentalium striolatum*, Stimpson.
9. *Puncturella noachina*, L.
10. *Ganesa nitidiuscula*, Jeffr.
11. *Trochus ottoi*, Ph.
12. *Cithna tenella*, Jeffr.
13. *Aporrhaïs serresianus*, Mich.
14. *Natica grœnlandica*, Beck; var. *contracta*.
15. *Natica montacuti*, Forb.
16. *Trophon carinatus*, Jeffr., sp. n.
17. *Fusus berniciensis*, King.
18. *Columbella haliæeti*, Jeffr.
19. *Defrancia formosa*, Jeffr., sp. n.
20. *Pleurotoma exigua*, Jeffr., sp. n.
21. *Cylichna alba*, Brown.
22. *Cylichna ovata*, Jeffr., = ? *conuloïdes*, S. V. Wood.
23. *Cryptaxis crebripunctatus*, Jeffr., n. sp.
24. *Scaphander puncto-striatus*, Mighels and Adams.

All except No. 21 and the new species have an extensive range in the North Atlantic.

The species of Mollusca procured during the cruise of the 'Triton' were 62.

For the geographical distribution, synonymy, and other remarks with respect to the above-named species, I would refer to my work on 'British Conchology,' my "Report of the 'Valorous' Expedition" and account of the Mollusca in the 'Proceedings' of the Royal Society for 1876 and the 'Annals and Magazine of Natural History' for 1876 and 1877, and to my papers on the Mollusca from the 'Lightning' and 'Porcupine' Expeditions in the 'Proceedings' of the Zoological Society for 1878, 1879, 1881, 1882, and 1883, as well as in other publications.

Descriptions and figures of some of the species, particularly those which are new to science, are subjoined.

1. COCCULINA SPINIGERA[1], Jeffreys. (Plate XLIV. figs. 1, 1 *a*, 1 *b*, 1 *c*.)

SHELL oval, convex, rather thin, semitransparent, somewhat glossy, especially on the upper part, where the spines have disappeared: *sculpture*, extremely numerous and delicate striæ which radiate towards the margin; these striæ are crested by rows of minute tubercles, each of which supports a fine short hair-like spine or prickle; the spines are easily removed, and disappear when the shell is subjected to the action of potash-water, showing that they are of a chitinous nature; the apex is quite smooth: *colour* white: *beak* very small, incurved and twisted downwards, forming a single whorl; it is persistent, but sometimes broken or injured by attrition; its propinquity to the hinder margin is in the proportion of 2½ to 6 as representing the total length of the shell: *mouth* oval: *inside* polished; there is no septum. L. 0·175, B. 1·25.

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[1] Prickly.

Station 10, 516 fathoms.

A great number of living specimens occurred in the tubes of *Teredo megotara*, which had perforated a sunken log of pine-wood. In these tubes, as well as in the crevices of the wood, also lived numerous specimens of *Idas argenteus*, which were attached by a strong byssus. See P. Z. S. for November 1882, p. 683. But the statement which I there made as to the present shell having been infested by a sponge is questionable, as I now believe that the hair-like spines which cover the shell belong to it, and are not parasitic. The mollusk is eyeless. Mr. Dall has ascertained that it has different sexes. Herr Friele has kindly supplied me with a sketch of the odontophore (laterals and uncini), which I am now enabled to represent in the accompanying Plate. He could not detect any central or rhachidian tooth.

2. COCCULINA CORRUGATA[1], Jeffreys. (Plate XLIV. figs. 2, 2*a*.)

SHELL oval, convex, but somewhat depressed, thin, opaque, and lustreless: *sculpture*, regular, fine, and close-set concentric striæ or wrinkles, which are chiefly observable and stronger round the margin, especially in front or at the broader end: *colour* chalky-white, except at the margin, which is yellowish-brown: *beak* small, incurved and slightly twisted to one side; the spire has a single whorl; the beak is placed close to the hinder margin, and nearly overlaps it: *mouth* oval: *inside* smooth: no septum. L. 0·075, B. 0·05.

A few specimens, with the last, and occurring under the same circumstances. This species differs from *C. spinigera* in size, sculpture, and the position of the beak. It is also eyeless.

3. ODOSTOMIA ELECTA[2], Jeffreys. (Plate XLIV. fig. 3.)

SHELL conical, thin, nearly transparent, and glossy: *sculpture*, slight but numerous microscopically visible striæ in the line of growth: *colour* clear white: *spire* short and oblique, somewhat turreted, and abruptly pointed; apex globular: *whorls* 4, rather swollen; the last is much broader than the next, and occupies three fourths of the shell when placed with its mouth upwards: *suture* distinct but not deep: *mouth* oval, occupying half the shell: *outer lip* rounded and thin, inflected and angulated above, expanded below: *inner lip* thickened and reflected on the umbilicus, disunited above from the outer lip: *umbilicus* forming a narrow chink: *tooth* small and sunken, but conspicuous, situate on the upper part of the inner lip or pillar: *operculum* withdrawn and not visible. L. 0·085, B. 0·06.

A single but living specimen from Station 10, 516 fathoms.

Its nearest ally is *O. rissoïdes*, which differs from the present species in having a much longer and tapering spire, and in the whorls more gradually enlarging.

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[1] Wrinkled.

[2] Choice.

4. TROPHON CARINATUS[1], Jeffreys. (Plate XLIV. fig. 4.)

SHELL distinguishable from *T. clathratus* in having a prominent keel in the middle of each whorl; the laminar ribs are fewer and obtusely angulated; the spiral striæ, which cover the interstices of the ribs, are numerous, regular, comparatively strong, and flexuous or curved: *colour* white: *inner lip* glazed and lustrous. L. (if perfect) 0·6, B. 0·25.

An imperfect but characteristic specimen from Station 13, 570 fathoms.

5. FUSUS SABINI, (*sabinii*) Gray. (Plate XLIV. fig. 5.)

Buccinum sabinii, Gray in Suppl. to App. of Parry's First Voyage, p. cxl (1824).

SHELL forming a somewhat short spindle, rather thin, semitransparent and rather glossy: *sculpture*, numerous fine and threadlike spiral striæ, of which there are from 20 to 30 on the last, and 8 to 12 on the penultimate whorl; these are crossed by microscopic and far more numerous striæ in the line of growth: *colour* under the epidermis chalky-white: *epidermis* pale yellowish-brown, filmy, and easily removed; it is fibrous towards the mouth: *spire* tapering to a blunt point; apex irregular, sometimes flattened at the top, but occasionally twisted: *whorls* 6–7, moderately convex; the last occupies rather more than two thirds of the shell when placed with the mouth upwards: *suture* rather deep: *mouth* pear-shaped, acutangular above; length (including the canal) exceeding the rest of the spire; inside slightly notched by the impression of the spiral striæ: *canal* shortish, turning somewhat abruptly to the left, equally wide and open throughout, and ending in a large and obliquely curved notch: *outer lip* flexuous and sharp-edged: *inner lip* polished by the continual attrition of the foot: *pillar* flexuous, obtusangular at its junction with the canal: *operculum* triangularly oval, strong, yellowish-brown or light horn-colour, marked with close-set lines of growth; nucleus terminal on the inner side, and falciform. L. 1·75, B. 0·75.

Many living specimens from Stations 8 and 9, in 608 and 640 fathoms.

Having carefully compared these and other specimens with the types of Reeve's *Fusus tortuosus* in my possession from the collection of the late Admiral Sir Edward Belcher, I must adhere to my opinion expressed in the 'Annals of Natural History' for April 1877, that both belong to one and the same species. *Sipho tortuosus* of G. O. Sars is a different species, and is the *Tritonium turritum* of M. Sars; my *Fusus attenuatus* is not a variety of that species. Besides the numerous localities there given, I am enabled, through the kindness of my friend Herr Friele, to add the Norwegian Arctic Expedition, Station 324, 123 fathoms, as well as the cruise of the 'Knight Errant,' in 540 fathoms. Gray contrasted his species with *F. gracilis* (his *Buccinum corneum*), and said it was " not so long and slender, and the whorls more convex, the aperture ovate instead of roundish-ovate." He called the striæ longitudinal, as being in the direction of the spire.

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[1] Keeled.

6. Fusus delicatus[1], Jeffreys. (Plate XLIV. figs. 6, 6 *a*, 6 *b*.)

Shell differing from *F. sabini* in the following respects:—It is smaller, more slender and cylindrical, and regularly tapering; the spiral striæ are much finer and more numerous; the epidermis is filmy and of a paler colour; the whorls gradually increase in size, and the last whorl is not so large in proportion to the others; the canal is shorter and considerably narrower; the operculum is ear-shaped and marked not only with close-set lines of growth but with a few oblique striæ in the opposite direction. L. 1·25, B. 0·5.

Several specimens from Stations 8 and 9, 608 and 640 fathoms; but they were mostly inhabited by a species of *Sipunculus*. Also from 540 fathoms in the 'Knight Errant' cruise, and erroneously named in my list of the Mollusca "*Fusus turritus*."

7. Fusus hirsutus[2], Jeffreys. (Plate XLIV. figs. 7, 7 *a*.)

Shell turreted, rather solid, opaque, and of a dull hue: *sculpture*, numerous fine and sharp spiral striæ, which are alternately but irregularly larger and smaller; they extend to the end of the canal; there are about 50 on the body-whorl, 20 on the penultimate, and 12 to 15 on the next whorl; besides these the surface is covered with minute and close-set longitudinal striæ, which produce by their intersection a decussation on the upper whorls: *colour* under the epidermis chalky-white: *epidermis* brownish-yellow, pilose, each of the spiral striæ being thickly clothed with countless short bristly hairs: *spire* long, tapering to a blunt point; apex regular, button-shaped: *whorls* 7–8, tumid, gradually enlarging; the last occupies about two thirds of the shell with the mouth upwards: *suture* excavated: *mouth* large, pear-shaped, inflected above; length (including the canal) nearly half that of the shell: *canal* short, very wide and open, turning to the left: *outer lip* curved and thin: *inner lip* broad and polished: *pillar* flexuous as in other species: *operculum* triangular, strong, light horn-colour, marked with fibrous and corrugated but irregular lines of growth; nucleus as in congeners. L. 2·25, B. 0·9.

A single but perfect specimen from Station 9, 608 fathoms. Professor Torell dredged this species at Spitzbergen.

8. Fusus concinnus[3], Jeffreys. (Plate XLIV. figs. 8, 8 *a*.)

Shell of an elegant shape, thin, semitransparent, and rather glossy: *sculpture*, numerous and delicate spiral striæ which cover the whole of the shell; there are from 30 to 40 on the body-whorl, 12 to 15 on the penultimate, 8 to 10 on the next, and 6 to 8 on the preceding whorl; the uppermost two whorls are apparently smooth, but show under the microscope indistinct traces of the striæ; there are also occasional but irregular lines of growth: *colour* white, with a slight tint of yellow: *epidermis* inconspicuous: *spire* elongated, tapering to a bulbous point; apex slightly twisted: *whorls* 5–6, convex; the last occupies rather more than two thirds of the shell: *suture* deep: *mouth* oblong, inflected above; length (including the canal) nearly half that of the shell: *canal* short, very wide and open, turning a little towards the left: *outer lip* curved and thin: *inner lip* filmy: *pillar* flexuous: *operculum* triangularly oval, pale yellowish-brown, marked as in *F. hirsutus*. L. 0·75, B. 0·35.

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[1] Delicate. [2] Bristly. [3] Neat.

A single specimen of this graceful little species occurred at Station 9 in 608 fathoms.

9. DEFRANCIA FORMOSA[1], Jeffreys. (Plate XLIV. figs. 9, *9 a*, *9 b*.)

SHELL having the shape of a small *Buccinum*, usually thin, opaque, and of a dark hue: *sculpture* variable, but ordinarily consisting of longitudinal and spiral thread-like striæ, which by their intercrossing produce a more or less regular decussation; the spiral are more numerous than the longitudinal striæ, and the latter are sometimes wanting; the points of intersection are occasionally nodulous or tubercular; the longitudinal striæ are either almost straight or curved, and in the latter case become strong and rib-like; the outside of the canal is marked lengthwise with oblique striæ, and in some specimens with also the spiral striæ in a cancellated manner; the fissural groove, lying immediately below the suture, is crossed by crowded and curved minute striæ in the line of growth; the apical or top whorls are exquisitely reticulated, as in other species of this genus, but now and then they are angulated in the middle of each whorl: *colour* whitish with a tinge of yellow, and a yellowish-brown apex: *spire* of moderate length, sometimes turreted, gradually sloping to a point; apex pinched up and disproportionally smaller than the rest of the spire; its point is usually sharp, but sometimes blunt and button-shaped: *whorls* 7–8, tumid, in some specimens angulated below the fissural groove; the last whorl occupies two thirds of the spire when the shell is placed with the mouth upwards: *suture* deep; the infrasutural groove is broad, and slopes downwards: *mouth* pear-shaped, somewhat exceeding half the shell in length: *canal* short, wide, and nearly straight, ending in a round notch: *outer lip* flexuous, owing to the incurvity of the fissural groove, acutangular at its junction with the periphery; its front edge is finely crenellated by the termination of the spiral striæ: *fissure* remarkably deep and broad: *inner lip* somewhat thickened, smooth and glazed: *pillar* rather long and flexuous. L. 0·5, B. 0·25.

A single specimen from Station 13, 570 fathoms.

Distribution. Norway; 'Porcupine' Expedition 1869, between the Hebrides and Faroes in 345 fathoms, and 1870 from the English Channel to Gibraltar in from 414 to 1095 fathoms; 'Challenger' Expedition, in the North Atlantic, 1000 fathoms.

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[1] Beautiful.

10. Pleurotoma exigua[1], Jeffreys. (Plate XLIV. fig. 10.)

Shell oblong, solid for its size, semitransparent, and rather glossy: *sculpture*, numerous regular and close-set spiral striæ, which are crossed by less conspicuous longitudinal rib-like striæ; the direction of these last follows the line of growth; the intercrossing of the two sets of striæ produces a delicate reticulation; the uppermost whorl is quite smooth and shining: *colour* milk-white: *spire* somewhat turreted, gradually tapering to a blunt point, and apparently truncated: *whorls* 4½, concave; the last occupies two thirds of the shell; the uppermost whorls form a bulb, and the half-whorl at the point is twisted inwards: *suture* deep: *mouth* or aperture oblong and narrowish, forming above a small ledge; length exceeding half the shell: *canal* very short and wide, nearly straight, ending in an obliquely rounded notch: *outer lip* obtusely angulated at the top, and elsewhere gently curved; edge thin and sharp: *labial slit* or fissural groove short and shallow: *inner lip* broad and glazed: *pillar* flexuous, sloping inwards to a cutting-edge: *operculum* not observable. L. 0·2, B. 0·15.

A single specimen from Station 13, 570 fathoms.

This species is allied to *P.* (*Bela*) *tenuicostata* of M. Sars, but is narrower; the longitudinal ribs or striæ are straight as regards the line of growth (instead of being flexuous as in that species); the spire is abrupt or apparently truncated at the top; and the fissural groove is much shallower.

11. Cryptaxis crebripunctatus[2], Jeffreys. (Plate XLIV. figs. 11, 11 *a*, 11 *b*, 11 *c*.)

Shell oval, thin, semitransparent, and glossy: *sculpture*, very numerous and regular fine spiral or revolving striæ, which are closely punctured; they are stronger at the base than at the crown: *colour* white: *spire* deeply sunken, and for the most part concealed in a small cavity in the centre of the crown; but the bulb-shaped apex is visible at the bottom of the cavity: *mouth* semioblong, contracted above and expanding below: *outer lip* slightly raised above the crown and channelled, curved in the middle and at the base: *inner lip* inconspicuous: *pillar* straight on the upper half and incurved below. L. 0·2, B. 0·1.

Three specimens from Station 13, 570 fathoms.

In the 'Annals and Magazine of Natural History' for June 1883 I indicated the probability that a species which was there described and figured as *Cylichna parvula* might be the type of a distinct genus, intermediate between *Cylichna* and *Utriculus*, because the spire was partly concealed; and I suggested the name *Cryptaxis*. I am now encouraged by the discovery of the present species to adopt the above generic name. I would not refer these species to the genus *Bullina* of Férussac, as defined by Messrs. Adams in their 'Genera of Recent Mollusca,' who say "spire rather elevated; . . . . coloured markings; . . . . . . outer lip grooved internally, and with the margin crenulated." None of these characters are applicable to either of the species now under consideration. They compare the genus with *Actæon*, which, according to them, the shells of *Bullina* greatly resemble. Their figures show the spire more or less raised; and they mention that the species are from Japan, Ceylon, and Australia. Woodward, in his 'Manual,' gives *Bullina* of Férussac as a synonym of *Aplustrum*, Schumacher, which was founded on the well-known *Bulla aplustre* of Linné. *Bullina* of Risso (1826) is the same as *Cylichna* of Lovén, and ought to take precedence of the latter name; its type was *Bulla cylindracea* of Pennant. I have two more undescribed species of *Cryptaxis* from the 'Porcupine' Expedition.

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[1] Little.

[2] Closely punctured.

EXPLANATION OF PLATE XLIV.

Fig. 1. *Cocculina spinigera*, p. 393.
1 *a*. Prickles or spines, magnified.
1 *b*. Lateral teeth of odontophore, magnified.
1 *c*. Uncini of same, magnified.
2. *Cocculina corrugata*, p. 394.
2 *a*. Sculpture, magnified.
3. *Odostomia electa*, p. 394.
4. *Trophon carinatus*, p. 395.
5. *Fusus sabini*, p. 395.
6. —— *delicatus*, p. 396.
6 *a*. Apex, magnified.
6 *b*. Ovi-capsule, magnified.
7, 7 *a*. *Fusus hirsutus*, p. 396.
8, 8 *a*. —— *concinnus*, p. 396.
9. *Defrancia formosa*, p. 397.
9 *a*. Sutural fissure, magnified.
9 *b*. Sculpture of apex, magnified.
10. *Pleurotoma exigua*, p. 398.
11, 11 *a*. *Cryptaxis crebripunctatus*, p. 398.
11 *b*. Apex, magnified.
11 *c*. Sculpture, magnified.

2. Descriptions of some new Species of Beetles of the Family Galerucidæ. By MARTIN JACOBY.

[Received June 2, 1883.]

(Plate XLV.)

OIDES, Weber.

1. OIDES APICALIS, sp. nov. (Plate XLV. fig. 1.)

Ovate-oblong, flavous; head and thorax impunctate; elytra finely punctured, dark violaceous blue, the lateral and the posterior parts of the sutural margin flavous.

Length 4–4½ lines.

Hab. Sumatra.

Head rather swollen, with a deep transverse groove between the eyes, above which a small but deep fovea is placed; clypeus transverse, swollen. Antennæ less than half the length of the body, entirely flavous, the third joint double the length of the second, fourth joint the longest. Thorax narrowly transverse, of equal width, the anterior and posterior margins parallel, the sides rounded near the base, slightly constricted in front of the anterior angles, the latter rather acute but not produced; surface shining, impunctate, flavous, with a few very obsolete depressions when seen in certain lights. Scutellum oblong, its apex rounded, flavous, impunctate. Elytra not wider at the base than the thorax, dilated gradually towards the middle, with a rather obsolete depression below the shoulders, the entire surface covered with fine punctures, rather closely placed; of an obscure dark violaceous blue, the lateral margins, apex, and the last third of the suture flavous, at the latter place this colour extends upwards in a pointed shape. Underside and legs flavous.

This species, of which two specimens are contained in my collection, is easily distinguished from *O. limbata*, Blanch., by the colour of the posterior part of the suture and by that of the antennæ. The elytra are also less closely and strongly punctured in the present insect.

There is a curious structural difference to be found in many species of the present genus, in regard to the elytral epipleuræ, which in most of the smaller species are broad and concave at the base, but disappear gradually towards the latter half of the elytra; in many large-sized species, however, as in *O. 10-punctata*, Billb., *O. 12-maculata*, Clark, &c., the elytra might almost be called simple, as the inner margin of their epipleuræ is put so far back near the sides of the body that it can be seen only when the insect is held in a certain position. This character may perhaps be of some use in a future monograph of the many and closely allied species.

2. OIDES AFFINIS, sp. nov. (Plate XLV. fig. 4.)

Broadly ovate, obscure fulvous; terminal joints of the antennæ, abdomen, tarsi, and a longitudinal broad band at each elytron black.

Length 3–4½ lines.

Hab. Neilgherries, South India.

Head scarcely swollen, impunctate with the exception of a few punctures in front of the eyes, transversely grooved between the latter; the frontal tubercles very distinct and almost contiguous. Antennæ longer than half the length of the body in the male, the third joint a little longer than the second, fourth joint distinctly longer than the third; the four lower joints fulvous, the rest black. Thorax not more than twice as broad as long, the sides evenly rounded, surface rather convex, extremely minutely punctured. Scutellum trigonate. Elytra convex, widened at the middle, very distinctly and closely punctured, the interstices finely wrinkled; a broad black band extends from below the base to near the apex, without, however, touching any of the margins. Underside and legs obscure fulvous. Abdomen and tarsi black.

Collection Jacoby.

In colour this species resembles greatly *O. dorso-signatum*, Clark, from Australia.

3. **Oides clarkii**, sp. nov. (Plate XLV. fig. 3.)

Oblong-ovate, testaceous; antennæ piceous; elytra closely punctured, the suture and a longitudinal band, divided at the middle, from the base to the apex black.

Length 3½ lines.

Hab. New Guinea, Waigiou.

Head with a central impressed groove and a deep transverse depression between the eyes; labrum testaceous, punctured; apex of jaws black. Antennæ elongate, the third and fourth joints nearly of equal length. Thorax narrowly transverse, the anterior and posterior margins parallel, the sides slightly rounded; surface transversely depressed in front of the anterior margin, and with a round shallow fovea at each side, obsoletely and finely punctured. Scutellum obscure piceous. Elytra widened towards the middle, the sides slightly constricted below the base; the surface covered with fine but distinct punctures, testaceous; a narrow sutural and a broad lateral band from the base to the apex, both bands joined at the latter place, black; the lateral band is divided longitudinally in the middle by a narrow space of the ground-colour. Underside and legs testaceous; tibia and tarsi slightly darker.

Collected by Mr. Wallace.

Allied to *O. fryi* and *O. seminigrum*, Clark, but distinguished from both by the sutural band. In one specimen before me the lateral elytral band is entire and not divided at the middle, but in other respects the specimen agrees with the type.

4. **Oides biplagiata**, sp. nov. (Plate XLV. fig. 2.)

Broadly ovate, flavous; thorax and elytra very finely punctured, the latter with a transverse band at the middle and a large oval spot at the apex black.

Length 4–4½ lines.

Hab. New Guinea, Port Moresby.

Head convex, with a central longitudinal impressed line; space between the eyes deeply transversely grooved, limited in front by a thickened oblique ridge. Antennæ about half as long as the body, obscure fulvous, the fourth joint nearly double as long as the third. Thorax narrowly transverse, the sides slightly widened in front of the base, the posterior angles rounded; surface rather convex, with a few oblique obsolete depressions near the sides and the base, extremely finely punctured. Scutellum impunctate. Elytra widened towards the middle, with a distinct flattened margin, extremely closely and more distinctly punctured than the thorax, flavous; a transverse band at the middle (consisting of two spots united, of which the outer one is the smallest), and a large oval-shaped patch near the apex black. Underside and legs entirely flavous.

Collection Jacoby.

Megalognatha, Baly.

5. **Megalognatha cruciata**, sp. nov. (Plate XLV. fig. 7.)

Elongate, convex, widened behind, fulvous; head, breast, legs, and the antennæ black; elytra very finely and closely punctured, fulvous, the suture and a transverse band at the middle black.

Length 3 lines.

Head very sparingly and finely punctured, deeply transversely grooved between the eyes; frontal tubercles as well as the carina strongly raised. Antennæ half the length of the body (♀), filiform, black. Thorax square-shaped, the sides slightly rounded, posterior margin distinctly concave at the middle; surface somewhat convex, without any depressions, fulvous, finely granulose punctate. Scutellum piceous. Elytra widened from the base to the apex, very convex at their posterior half, and from there to the apex abruptly declined; surface closely and finely granulose-punctate, fulvous; a longitudinal band at the suture, gradually narrowed near the apex, and a transverse band below the middle, not quite extending to the lateral margin, black; from the shoulder to below the middle a single costa is seen at each elytron. Underside and legs black, finely covered with yellowish pubescence. Abdomen fulvous, the first segments more or less stained with black.

Hab. Africa, Transvaal.

A single female specimen is contained in my collection.

6. MEGALOGNATHA UNIFASCIATA, sp. nov. (Plate XLV. fig. 8.)

Black. Antennæ in the male triangularly widened at the seventh and eighth joints; in the female simple. Thorax and the elytra closely punctured; the latter flavous, with a broad transverse band below the middle.

Length 2½–2¾ lines.

Head impunctate, the lower part projecting; labrum obscure testaceous. Antennæ half the length of the body, black; the terminal joints testaceous at their inner sides; the seventh and eighth joints flattened and with an angular projection within, rest of the terminal joints less flattened. Thorax square-shaped, the space below the anterior margin raised into a triangular-shaped elevation; rest of the surface finely punctured in the male, more strongly granulose-punctate in the female. Scutellum black. Elytra punctured as in the preceding species, testaceous or flavous, with a broad transverse black band below the middle, which does not quite extend to the lateral margin. Underside and legs black; abdomen fulvous.

Hab. Transvaal. Collection Jacoby.

Distinguished from *M. cavicollis*, Baly, by the shape and colour of its thorax.

7. MEGALOGNATHA BIPUNCTATA, sp. nov. (Plate XLV. fig. 9.)

Elongate, convex, subparallel, fulvous; antennæ, legs, and breast obscure piceous; thorax and elytra finely punctured, a spot at the middle of each elytron black.

Length 4 lines.

Head impunctate. Antennæ very closely approached in the male, the seventh and eighth joints in the same sex triangularly widened and flattened, simple in the female; all the joints covered with fine pubescence. Thorax square-shaped, the sides rounded and widened towards the middle; surface with an obsolete fovea in front of the anterior and posterior margin, closely and finely punctured. Scutellum large, as broad as long, fulvous. Elytra nearly parallel, convex, their last third rather abruptly declined; surface punctured as in the preceding species, fulvous; each elytron with a round transverse black spot immediately below the middle. Underside and legs finely pubescent.

Hab. Nguru Mountains, East Central Africa. Collection Jacoby.

PACHYTOMA, Clark.

8. PACHYTOMA GIBBOSA, sp. nov. (Plate XLV. fig. 6.)

Elongate, widened posteriorly, piceous below; head, thorax, scutellum, and first three joints of the antennæ flavous; elytra ferruginous, very closely and finely punctured.

Length 7½–8 lines.

Hab. Old Calabar (*Rutherford*).

Head with a fovea between the eyes, scarcely visibly punctured. Antennæ short, robust, black, the three basal joints flavous. Thorax twice as broad as long, the sides rounded, the angles obtuse, surface extremely minutely punctured. Scutellum trigonate, its apex obtusely rounded. Elytra convex, widened at the middle, narrowed towards the base and apex, ferruginous, more distinctly but as closely punctured as the thorax. Underside and legs piceous; tibiæ distinctly channelled; claws bifid.

Two specimens in my collection.

In its general appearance and shape this species resembles greatly several insects of the genus *Oides*, from which the elytral epipleuræ extending to the posterior angle will at once distinguish it. Besides this character, all the others peculiar to the present genus are present. *P. gibbosa* seems to be the largest species at present described. In a short monograph of the genus by Dr. Karsch (Berlin. ent. Zeitsch. 1881) I find a species referred to under the name of *P. gigas*, Illig. This is probably a mistake, and refers to *P. gigantea*, Illig.

MESODONTA, Baly.

9. MESODONTA TRANSVERSO-FASCIATA, sp. nov. (Plate XLV. fig. 5.)

Elongate-ovate, widened behind; black below; basal joint of the antennæ, the thorax, and the scutellum obscure flavous; elytra granulose-punctate, green, subopaque, a transverse band behind the middle obscure flavous.

Length 6 lines.

Hab. West Africa (*Rutherford*).

Head rugose-punctate, black, lower part of face flavous. Antennæ about half the length of the body, the fifth to the ninth joints dilated and gradually shortened, the tenth trigonate, short, eleventh joint elongate. Thorax about twice as broad as long, the posterior margin slightly sinuate at each side, the latter narrowed from base to apex; upper surface obsoletely three-foveolate, fulvous or flavous, closely rugose-punctate. Scutellum trigonate, closely punctured. Elytra much widened towards the apex, narrowly margined below the middle at the sides, very closely and finely granulose-punctate, of a bright green, but little shining, with a slightly sinuate transverse flavous band below the middle extending to either margin.

In my collection.

The present species forms the second one known from Africa, and seems allied to *M. limbata*, Baly, from which the flavous elytral band and want of the similarly coloured margins of the elytra separate it.

MERISTA, Chap.

10. MERISTA OBERTHÜRI. (Plate XLV. fig. 10.)

Oblong-ovate, widened behind, black; thorax impunctate; elytra very finely punctured, the extreme lateral margin, a narrow transverse band before, and two others behind the middle flavous; claws bifid, the inner division small.

Length $4\frac{1}{2}$–5 lines.

Head impunctate, black. Thorax subquadrate, the anterior angles slightly produced and thickened; surface impressed with two transverse shallow grooves, of which the first is situated close to the anterior margin, the second near the middle, more deeply impressed and obliquely shaped at the sides; disk impunctate, with the exception of a few punctures along the anterior and posterior margins. Scutellum broad, impunctate. Elytra much wider at the base than the thorax, distinctly widened behind, very greatly in the female, entirely black, very finely punctured, the punctures now and then arranged in semi-regular rows; the extreme lateral margins, a very narrow transverse band before, two others more closely approached behind the middle, and the posterior part of the suture flavous.

Hab. Thibet (Tatsiénlon Mount). Collection Oberthür and Jacoby.

The antennæ are more than two thirds the length of the body, and of the usual structure to be found in the present genus. Of the three bands at the elytra the middle one extends generally to the lateral margin, which is not the case with the other two. From all the described species, the present one, of which I have seen six specimens, sent to me by M. Oberthür for determination, is easily distinguished by its coloration.

PHYSONYCHIS, Chap.

11. PHYSONYCHIS NIGRICOLLIS, sp. nov. (Plate XLV. fig. 11.)

Elongate, subparallel, flavous below; base of the head and the thorax black; elytra metallic green or blue, closely rugose-punctate.

Length 4–$4\frac{1}{2}$ lines.

Head closely and distinctly punctured at the vertex, the latter black; frontal tubercles highly raised, elongate; the latter and lower part of the face fulvous. Antennæ fulvous or piceous. Thorax transverse, narrowed from the base to the apex, the sides nearly straight and longitudinally flattened; surface very finely punctured at the disk, the latter black, the sides with a metallic green gloss. Scutellum black. Elytra rather convex, slightly but distinctly widened towards the apex, very closely punctured, the interstices finely rugose, of a metallic green or blue colour. Entire underside and the legs fulvous.

Hab. East Africa (coll. Jacoby); Zanzibar (coll. R. Oberthür).

Closely allied to *P. smaragdina*, Clark; but at once separated by the black colour of the thorax and of the scutellum. The elytra show no trace of longitudinal costæ as is sometimes seen in the allied species. The present insect is also larger, and the antennæ are more filiform. The specimens contained in my collection and in that of M. Oberthür are all females. I may further add that the thorax of *P. smaragdina* is much more strongly punctured, and that Clark gives the colour of the entire insect as metallic green or æneous, which is a mistake, the underside being of the same colour as that of the present insect.

SYSTENA, Clark.

12. SYSTENA DISCOIDALIS, sp. nov. (Plate XLV. fig. 12.)

Elongate, flavous; head and thorax impunctate; elytra extremely finely punctured, their posterior two thirds black, the latter not extending to the margins.

Length 3½ lines.

Hab. Ecuador.

Head entirely impunctate; the frontal tubercles rather obsolete and divided by a very shallow groove; carina indistinct; lower part of face depressed. Jaws black at their apex. Antennæ half the length of the body, filiform, entirely pale fulvous; all the joints, with the exception of the short second one, of nearly equal length. Thorax nearly twice as broad as long, subquadrate, the sides obliquely shaped, forming a distinct angle before the middle; anterior and posterior angles rather rounded; surface with a rather deep transverse sinuate groove in front of the base, the sides of which are gradually lost near the lateral margins; disk impunctate. Scutellum broadly triangular. Elytra wider than the thorax, subdepressed, slightly widened towards the middle, with a shallow sutural depression below the base, very finely and closely punctured, flavous, with an oval-shaped black patch extending from below the base to the apex, but leaving all the margins of the ground-colour. Posterior femora moderately thickened; their tibiæ with a distinct spine.

A single specimen, collected by Mr. Buckley, contained in my collection.

From the typical species forming the genus *Systena*, which are known to me, the present one deviates somewhat by the rather deep thoracic groove, the peculiar coloration, and its size; in all other structural characters, including the closed anterior coxal cavities, it agrees with the rest.

Notes.

Merista variabilis, Har. (Stett. ent. Zeit. 1880), is identical with *Haplosonyx trifasciatus*, Hope; the type contained in the British Museum agrees with v. Harold's description, that of Hope's being unrecognizable.

Merista rufipennis, Har., is synonymous with *Leptarthra dohrni*, Baly, the latter author having omitted to mention in his description the red colour of the elytra.

Nerissus griseo-scutellatus, Karsch (Berlin. ent. Zeitsch. 1882, December), is without doubt identical with *Cheiridea subrugosa*, Jacoby (P. Z. S. 1882, p. 55).

EXPLANATION OF PLATE XLV.

Fig. 1. *Oides apicalis*, p. 399.
2. —— *biplagiata*, p. 401.
3. —— *clarkii*, p. 401.
4. —— *affinis*, p. 400.
5. *Mesodonta transverso-fasciata*, p. 403.
6. *Pachytoma gibbosa*, p. 403.
Fig. 7. *Megalognatha cruciata*, p. 401.
8. —— *unifasciata*, p. 402.
9. —— *bipunctata*, p. 402.
10. *Merista oberthüri*, p. 404.
11. *Physonychis nigricollis*, p. 404.
12. *Systena discoidalis*, p. 405.

3. On the Madreporarian Genus *Phymastræa* of Milne-Edwards and Jules Haime, with a Description of a new Species. By Prof. P. Martin Duncan, F.R.S. (Communicated by Dr. Sclater, F.R.S.)

[Received May 29, 1883.]

Contents.—I. Introduction. II. The Generic Diagnoses of *Phymastræa* given in 1848 and 1857. III. The emended Diagnosis of the Genus. IV. Description of the Species hitherto known. V. Description of a new Species. VI. Remarks on the Structures of *Phymastræa irregularis*, Dunc. VII. The Affinities of the Genus with others of the Recent Coral-fauna. VIII. The Affinities with Extinct Genera.

I. *Introduction.*

The species of the genus *Phymastræa* are rare; hitherto only two have been described, and a third is now brought forward for the first time. The genus belongs to the subfamily Astræaceæ of the family Astræidæ, and all the species are recent forms. Their structures are very remarkable, and recall in some points those of fossil forms.

In fact the genus, which is remarkably well defined, is exceptional amongst the recent Astræidæ, has a very old-fashioned appearance, and would not have been out of place in an early Secondary coral-fauna.

The species were studied in the first instance by MM. Milne-Edwards and Jules Haime, and they included them in the genus *Phymastræa*, which was established for the purpose in 1848[1]. Subsequently the diagnosis of the genus was given in their work entitled 'Recherches sur la Structure et la Classification des Polypiers recents et fossiles;' and finally in their great work, the 'Histoire naturelle des Coralliaires,' tome ii. p. 499 (1857).

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[1] Comptes Rendus de l'Académie des Sciences, t. xxvii. p. 494.

The generic diagnosis of 1857 does not correspond in a very important point with that published in 1848; and there is no doubt that the last diagnosis is erroneous. The great French zoöphytologists described two species of the genus *Phymastræa* in their last-mentioned work, having noticed them fully in their previous one. Unfortunately the geographical positions of the two species are not known. Probably they are from the Eastern seas.

II. *The Generic Diagnoses of* Phymastræa[1] *given in* 1848 *and* 1857.

The generic diagnosis given by MM. Milne-Edwards and Jules Haime in 1848 is as follows:—

"Corallum in a convex or plane mass. Corallites prismatic and enveloped from the base to the summit by a thin epitheca without a trace of costæ. Corallites close, not joined by thin walls but, at certain distances, by large wart-like projections, so that there are considerable spaces between the walls of contiguous corallites. The gemmation is extracalicular and subapical. The walls are thick; the calices are subpolygonal, and their margins are free; the columella is spongy in texture and well developed; and the septa are well developed, slightly exsert, and strongly toothed, especially near the columella."

The generic diagnosis published in 1857 contains the same characters, but there is an alteration regarding the method of increase of the corallum in the nature of the gemmation. This is stated to be calicular and submarginal.

Fortunately the drawings and descriptions of the species of *Phymastræa* which were published along with the first diagnosis of the genus will satisfy any student of the Madreporaria that the gemmation is extracalicular, and from the wall beyond the edge of the calices. The second diagnosis is therefore incorrect; and this opinion is maintained after the examination of the third and hitherto unpublished species.

In noticing the remarkable method of the junction of the corallites of *Phymastræa*, MM. Milne-Edwards and Jules Haime state that the genus has great affinities with others of the Astræidæ, and that this method is characteristic.

It is necessary to draw attention to the statement that the corallites are invested with a thin epitheca and that there is no trace of costæ. It is evident, moreover, that MM. Milne-Edwards and Jules Haime considered the junction-processes to be invested with epitheca, but to consist of an almost compact structure. These processes "*se soudent fortement à la muraille d'un polypiérite voisin.*"

In the delineation of the species *Phymastræa valenciennesi*, Ed. & H., on pl. ix. figs. 3 & 3 *a* (Ann. des Sciences Nat. 3 série, t. x., Zool.), it is perfectly evident that something more than costal structure is implicated, for there are only two rows of processes to one face of the walls of a corallite. The processes stretch across several costæ and intercostal spaces, and therefore the true wall adds to the growth as well as the costæ.

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[1] *φῦμα*, a thing that grows upon the body.

The study of the new species confirms this view of the nature of *Phymastræa* and that the gemmation is extracalicular.

It is proposed to emend the genus as follows:—

III. *Characters of the Genus* Phymastræa, *Milne-Edwards & Jules Haime, emended.*

The corallum is compound, massive, and its free surface is convex or plane. The corallites, more or less prismatic, increase by extracalicular gemmation and are joined together by short growths from costæ, or from the wall, which are placed with some regularity in vertical series, elsewhere they are separate. An epitheca exists which may environ the growths. There is a columella, an exotheca, and a well-developed endotheca. The costæ may or may not be apparent.

IV. *Description of the Species hitherto known,* Phymastræa valenciennesi *and* P. profundior.

PHYMASTRÆA VALENCIENNESI, Ed. & H. (Hist. Nat. des Corall. vol. ii. p. 500).

The corallum is an incrusting subplane form, with a large columella and four more or less complete cycles of septa, the larger being exsert. The nodules are large and warty, and there are two vertical series of them on each face of the more or less prismatic-shaped corallites; they are enveloped in epitheca. The calices are shallow and pentagonal in outline, and measure from 8 to 10 millim. in diameter.

Locality unknown. Specimens in the Michelin Collection at Paris.

PHYMASTRÆA PROFUNDIOR, Edwards & Haime.

The corallum is incrusting and convex. The calices are polygonal, and are 8 millim. in diameter and are deep. The columella is moderately developed, and there are usually three cycles of septa more or less complete, and sometimes there is one septum of a fourth in each system. The septa are exsert, thickest at the wall, and have a large dentation near the columella. The junction-processes are slender.

Locality unknown. Specimens in the Michelin Collection at Paris.

The last species is distinguished from the first-named by having deep and smaller calices, a smaller columella, a lower septal number, and slender junctions.

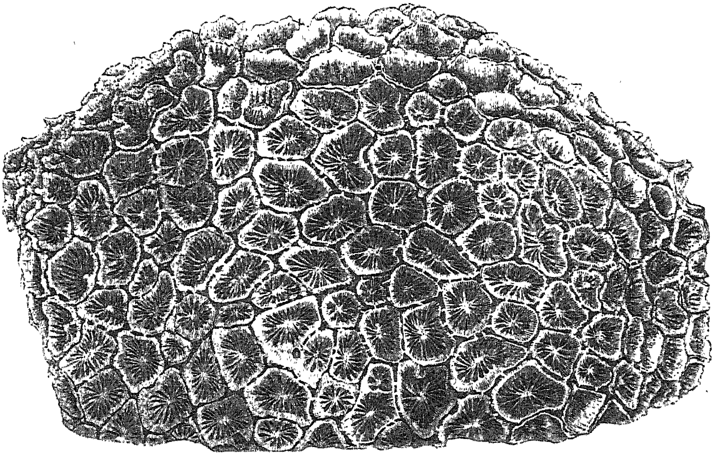
As the genus was determined by MM. Milne-Edwards and Jules Haime after the study of these two species, it is clear that the species about to be described is very distinct, for it has costæ from which the junction-processes arise.

V. *Description of a new Species.*

PHYMASTRÆA IRREGULARIS, sp. nov.

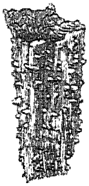
The corallum has a small adherent base and a large irregularly hemispherical shape, the surface being gibbose here and there. The corallites are numerous, are small at the base, widen rapidly with height, and are very irregular in their outlines and dimensions; each is separated from its neighbours even at the calice by a narrow space which is crossed by slender junction-processes. The calices vary in size and shape and are rather deep; they are angular in outline

Fig. 1.



Phymastræa irregularis (corallum from above).

Fig. 2.



Phymastræa irregularis (side view of a corallite).

and may be hexagonal, pentagonal, quadrangular, and triangular, or even deformed. The margins of the calices are sharp; the septa are non-exsert, unequal, some being very long and others quite rudimentary, and the cyclical arrangement is confused in the extreme. There is little or no difference between the primaries and secondaries, and some part of a system usually aborts. Three cycles of septa in six systems with some higher orders, abortion taking place here and there, is the rule; and the more irregular the outline of the calice, the greater is the confusion of the septal arrangement. The columella is small, lax, and trabeculate, being formed by processes from the septal ends.

The costæ are distinct and unequal low down on the corallites, and indistinct and absent higher up, although in some instances they can be traced to the calicular margin. The larger costæ have nodules on their free edge placed in linear series, and often extending over an intercostal space and smaller costæ to the next large one. These nodules join those of approximated costæ of neighbouring corallites, and form short processes. Junction-processes occasionally do not correspond to costæ. An epitheca exists over each corallite, especially low down; it covers the costæ and intercostal spaces and laps round the junction-processes; it is membranous-looking and has a few transverse and other ridges. A small amount of exotheca exists between the costæ, and the endotheca is largely developed, coming up to the base of the calices, and usually closing them below, but the dissepiments are not very close. The growth is by gemmation, which may occur anywhere on the outside of a corallite from below the calicular margin to close to the base.

Height of the corallum or colony 4 centim., breadth 10 centim. Width of calices from 3 millim. to 1 centim.

Locality. West coast of India, shallow water, fixed on an *Ostrea.*

The new form is distinguished from its nearest ally *Phymastræa profundior*, Ed. & H., by having well-developed costæ, non-exsert septa, and extremely irregular calices.

VI. *Remarks on the Structures of* Phymastræa profundior.

The attachment of the colony or corallum is by a comparatively small base to a shell, and it does not appear that it sprang from one corallite. The bases of several corallites may be seen in contact with the shell; and it is evident that they and their buds contribute to the symmetrical development of the whole colony. The corallite walls are solid and thick, except where they are growing at the calicular margin. The buds, when they arise close to the calicular margin of the parent, produce a certain amount of thinning of the parent wall, and often give the appearance of fissiparity. Lower down, the buds communicate with the visceral cavity of the parent; and there is a space at their base, where they spring from the parent, which leads into its interior.

There is considerable distance between the corallites at the surface, amounting to 1 millim. and more, and this is crossed by the junction-processes. These are very variable in their size and distribution; some do not reach across, and others are constricted in the middle. Very broad ones are exceptional.

The irregular shape of the corallites and calices is due to pressure during growth and the pushing upwards of growing buds; and this irregularity of outline appears to have interfered with the septal distribution.

In a very small calice belonging to a small bud, which is nearly symmetrical and circular in outline, there are six primaries; but where a little pressure has produced flattening, one of the primaries is smaller than the others and might be mistaken for a secondary septum. There are six systems of septa in the bud, and in four there is a secondary septum; two of them are long and two short. In the other two systems, near the flat part, there are no secondaries.

A second bud, which is oval elliptical in outline, being compressed from side to side, has six primaries, and where the pressure was at one end the primary there is small. There are, as usual, six systems. In the first, commencing to the right of a primary in the long axis of the calice, there is a secondary which is long, and in the second the secondary is a mere rudiment. In the third system the secondary is rudimentary, and so it is in the fourth; so that the third and fourth systems, with the intermediate small primary, look like one system. The fifth system has a long secondary and a tertiary, small and rudimentary, on either side; and the sixth system is like the second.

In the larger calices the secondaries equal the primaries, and some tertiaries do the same; moreover, in the same system a tertiary may abort or be rudimentary, so that there are three successive septa equal in length, *i. e.* a primary, a tertiary, and the secondary, and then comes a small tertiary. In the same calice in the next system, the normal long secondary has short tertiaries on either side; but the next system has a secondary equal in length to the primaries; on one side of it is a small tertiary, and on the other a long tertiary with a small septum between it and the secondary. This is a very irregular and abnormal distribution. In the next system the secondary is small and the tertiaries are as large as primaries, and between the primaries and the tertiaries is a rudimentary septum. None are found on either side of this secondary septum. The irregularity of the septal distribution in the last system of all transcends any thing I have ever seen. The secondary and the two tertiaries are equal in size and resemble primaries; and there is a long septum occupying the position of the fifth order between each tertiary and the secondary. Between one primary and the tertiary there is a septum of the fourth order, and between the other primary (the first in the calice) and the tertiary there are two septa! In the largest calices the septal arrangement appears to be without definite arrangement in cycles and systems, and large and much smaller septa alternate.

Sections of the corallum must cut across corallites at different angles to their long axes; and the appearances presented here and there, although perfectly explicable in the perfect specimens, might be mistaken for fissiparous calicular division. The appearance of the sections reminds one of that of many fossil corals which have weathered, or which have been partly preserved, or which are offered to the student in sections. The truth could not be ascertained from such relics.

VII. *The Affinities of the Genus with others of the Recent Coral-fauna.*

The genus *Phymastræa* would be very isolated in the classification were the two original species the only ones; but the new species, on which the costæ are tolerably well developed, allies it to *Heliastræa*. It does happen that very costulate Heliastræans have a union between opposing costæ by their spinulose growths, but it is a rare and not invariable occurrence. The growth of the two genera is much the same; but the presence of exotheca extending beyond the costæ and between the corallites in *Heliastræa* is a remarkable distinction, and decides the comparatively symmetrical shape of the Heliastræan calices. The genus *Astræa* appears at first sight to be allied to *Phymastræa*; but a careful study of its structure indicates that its junction-processes are synapticula.

The bushy forms which increase by gemmation from the external wall below the calice, and which have a more or less complete epitheca, and belong to the genus *Cladocora*, cannot be associated with *Phymastræa*, for when junction of corallites does occur in them it is through the epithecal bands which exist here and there, and not by means of mural structures.

In classification it is therefore requisite to leave the genus *Phymastræa* where MM. Milne-Edwards and Jules Haime placed it, between *Heliastræa* and the genera with entirely soldered or united walls.

VIII. *The Affinities with Extinct Genera.*

Some of the early Secondary corals have a superficial resemblance to *Phymastræa*, especially the species of *Elysastræa* described from the Infra-Lias of the Sutton Stone and Brocastle in South Wales. The resemblance is with the species described by MM. Milne-Edwards and Jules Haime; and the figures given by me in the 'Monograph of the British Fossil Corals,' second series, part iv. no. 1, Palæontog. Soc. 1867, plate vi. figs. 5–13, especially figure 10, are very suggestive. But the complete epitheca does not surround junction-processes in *Elysastræa*; they do not exist. In the genera more or less allied to *Cladocora*, and which are found fossil, there are no junction-processes. The genus really stands alone in its characteristic method of corallite union.

4. Notes on the Anatomy of *Sus salvanius* (*Porcula salvania*, Hodgson).—Part I. External Characters and Visceral Anatomy. By J. G. Garson, M.D., F.Z.S.

[Received June 5, 1883.]

One of the Pygmy Hogs recently acquired by the Society having died, it was put into my hands for examination.

In the present communication I intend only to treat of the external characters, and the digestive, circulatory, and respiratory organs and brain, reserving the muscular anatomy, as well as that of the vessels, nerves, and other parts of the body, and the osteology, for a subsequent communication.

The body is covered with brownish-black bristles, sparsely set on the abdomen, especially between the legs, on the sacral region, and hind limbs. The posterior surface of the ears is naked; and there are only a few fine hairs on their anterior surface. The tail is hairless. A slight increase in the thickness and length of the hair and bristles is observable on the back of the neck. The hair is thickest on each side of the body behind the shoulders. There is no underhair present at any part of the body. The colour of the skin is dark. On the abdomen are three pairs of nipples; the anterior pair are smaller in size than the other two pairs.

The body measures in length from the tip of the snout to the tip of the tail 58 cm. From the anterior angle of the eye to the tip of snout measures 7·3 cm. The length of the ear, which is ovoid in form, is 4 cm.; the breadth is 5·4 cm. The length of tail is 3·2 cm. The length of the manus, from the carpus to the tip of the central digit, is 6·5 cm., and from the carpus to the inner short toe 4·3 cm. The length of the pes is 4 cm., and from the tarsus to the inner toe 2·2 cm. The inner small second digit is slightly shorter than the outer fifth digit, both in manus and pes. This condition obtains in both the manus and pes of *Sus scrofa*, as I have had occasion to verify by examination of specimens in the College-of-Surgeons Museum. No trace of ducts opening on the skin at the inner side of the manus could be discovered. The permanent incisors and canines, the first and second premolars, and the first and second molars have been acquired. The third and fourth milk-molars are in place and are much worn. The ultimate lower molars have appeared, but are not full-grown: those of the upper jaw have not penetrated the gums; but on cutting into the gums their presence could be detected.

The adult dentition is I. $\frac{3}{3}$, C. $\frac{1}{1}$, P. $\frac{4}{4}$, M. $\frac{3}{3}$, exactly the same, then, as that of the Common Pig.

Being a female, the canines are small; but in the male now living in the Society's Gardens they seem to be well developed, and project slightly beyond the upper lip.

The *tongue* measures 9·5 cm. long by 2·4 cm. in breadth across the anterior part and 2 cm. across the posterior portion, is flat, and has the intermolar eminence less marked than in most Ungulates. The surface is covered with fine conical papillæ, among which, here and there, regularly over its whole extent, are scattered fungiform papillæ of a white colour. These papillæ are aggregated in a row along either side of the tongue. On the posterior portion are two large circumvallate papillæ of whitish colour, situated symmetrically on either side of the median line. Behind these the conical papillæ become large and soft. The specimen under observation showed a number of transverse markings, corresponding apparently to the rugosities on the palate; there were also some transverse markings or cracks observed on the posterior portion.

The *epiglottis* is of large size; and there is a large pouch-like cavity between it and the back of the tongue.

The *œsophagus* is about 15–16 cm. in length; at its lower end, immediately before entering the stomach, its mucous lining becomes thrown into longitudinal folds and becomes thickened.

The *stomach* is in general outline essentially like that of *Sus scrofa*. When laid out flat it measures 12·2 cm. in its long axis and 8·3 cm. in depth between the two curvatures. To the left of the œsophageal opening is a conical pouch-like projection arising as it were from the left upper and posterior part of the viscus. The walls of the pouch are thick, and have longitudinal markings of bands of fibres running on the surface, directed towards the apex of the cone. On opening the viscus, it is found that the mucous membrane of the pouch-like cavity is very rugose, and that there is a well defined constricting ring developed on the right side or the side next the œsophageal opening which separates the pouch from the remainder of the gastric cavity. The thickened epithelium of the œsophagus extends some distance over the lining of the upper wall of the stomach around the cardiac orifice, and is so folded at the latter point as to form a sort of valve as in the Pig. The transverse ridge which marks off the antrum pyloricum is less marked than it is in the Pig. Towards the pylorus the walls of the stomach become considerably hypertrophied. The pylorus can be completely occluded by an oval pad situated on the side of the lesser curvature, which fills up completely its crescentic and concave under portion just as in the Pig.

The *small intestine* is long but of small calibre, and when *in situ* is situated chiefly on the right side of the abdominal cavity. The duodenum makes a moderate-sized loop to the right before it crosses beneath the ascending colon. The Peyer's patches are scattered through the intestine; but there is no large patch at the lower end of the ileum like that found in the Pig. The last part of the ileum ascends to the top of the cæcum, which lies rather to the left side with its apex upon the bladder. The *cæcum* is saccular, measuring 7·1 cm. in length. Its outline is straight, in contradistinction to the irregular crenated outline of that of the common Pig. A strong band of muscular fibres runs down the internal or left surface; a second band runs down the external or right surface; and extending from the ileum to the posterior surface of the cæcum is a third band. From the top of the cæcum arises the colon, which has a spiral arrangement, in form like two cones united by the apices, the bases being oval, however, instead of round. The lumen of the first part of the colon is greatest. At the top of the coil the intestine loops round, and, reversing its course, passes out at the base of the coil, ascends in front of the duodenum and passes to the left, then finally enters the pelvis. The arrangement is essentially that found in the Pig. The various coils of colon are united firmly together by fibrous tissue: the first part is crenated in outline; but the remainder is regular and uniform. The large intestine was found, on opening the abdominal cavity, to occupy chiefly the left side, and presented a marked contrast to the small intestine from its somewhat dark colour as compared with the dirty-yellow colour of the latter.

The liver[1] has no suspensory ligaments or round ligament. The umbilical fissure is well marked, and divides the viscus into two segments of nearly equal size. The right central lobe is considerably larger than the left, while in the Pig they are of almost equal size. The free border of the right central lobe is broken by a cystic fissure of small size. The superior or diaphragmatic surface of the left central lobe, and partially also that of the right, is excavated deeply, and the hollow filled up by the sac of a cysticercus, of which two were found—this one attached to the liver, and a second, free, in the abdominal cavity. The attached border of the right segment of the liver is notched for the vena cava, which is superficially placed and does not tunnel through the substance of the liver as in the specimen of *Sus scrofa* before me. The condition which obtains here is precisely that which was found by Prof. Flower to exist in *Phacochœrus* and *Potamochœrus*, notes on the dissections of which he has kindly placed at my disposal. In both of these genera the vena cava is superficial. The Spigelian lobe is well defined, but does not form any projection. The caudate lobe is well defined, and seems to have a tendency to be more complicated than in the Pig.

The *omentum* is small in quantity and shrivelled up in bands; it is also characterized by the absence of fat.

Immediately below the cartilages of the larynx situated on the front of the trachea is the thyroid gland, which measures 3·2 cm. in length (in the axial line) by 1·3 cm. broad and 1·4 cm. in depth (dorso-ventrally).

The *trachea* measures about 9 cm. in length; at its posterior end it divides into two short bronchi (1 cm. long) which immediately enter the lungs. About 2·5 cm. above the bifurcation, the trachea gives off a branch to the upper lobe of the right lung. This branch is about one third the size of the bronchus, and, immediately on entering the lung, splits up into two branches, one of which runs upwards, the other downwards. This arrangement of the three bronchi is precisely what is found in the Pig.

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[1] The description of this organ given here is on the plan proposed by Prof. Flower in his Hunterian Lectures at the Royal College of Surgeons on the organs of digestion in the Mammalia, published in the 'Medical Times and Gazette,' Feb. 24 to Dec. 1872—a source which I have freely availed myself of in the description of the digestive organs in the specimen under consideration.

The right lung is composed of three lobes—an anterior and a posterior dorsal lobe and an anterior ventral lobe. The anterior dorsal lobe is subdivided into an anterior division and a posterior division. The anterior portion hooks forwards and downwards in front of the heart, more or less completely covering the right auricle. The ventral lobe lies against the posterior wall of the left ventricle, and is deeply grooved for the ascending cava.

The left lung consists of two lobes—an anterior and a posterior dorsal lobe, the former of which is subdivided into an anterior and a posterior portion. The anterior portion runs directly forwards, while the posterior portion is directed downwards dorso-ventrally. The extreme length of the lungs is about 12 cm., and the extreme depth along the diaphragmatic surface is 9 cm. A portion of the left lung in the form of a small lobule intervenes between the diaphragm and the heart.

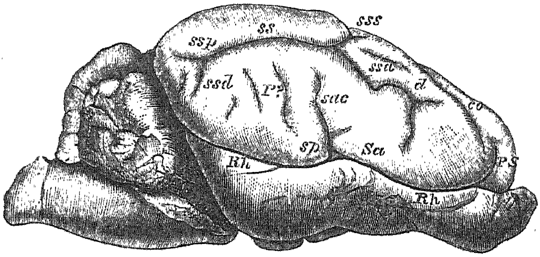
The heart measures from its base to apex 5·2 cm.; the antero-posterior length from the margin of one ventricle to that of the other is 5 cm.; the transverse diameter is 3·5 cm.

The *spleen* is long and narrow, very similar in all respects to that of the Pig, but differs from that of *Dicotyles* in being more elongated and not so broad at the posterior end.

The *mesenteric glands* are numerous and of large size. In some instances several glands are aggregated together so as to form large glandular patches between the folds of the mesentery. The vessels of the mesentery are quite straight, as in the Pig.

The *brain* is of small size, measuring, from the olfactory lobes to the posterior part of the cerebellum, 6·2 cm. in length, and 3·8 cm. in breadth. The fissures and convolutions are well marked, and can readily be compared with those of the common Pig. Adopting the nomenclature proposed by Krueg for the different cerebral fissures[1], we recognize the rhinal fissure (*Rh*) extending along the lower part of the cerebrum on each side throughout its whole length. About the centre of this fissure (figs. 1 and 2), but somewhat nearer the posterior than the anterior end, are the various portions of the Sylvian fissure, the

Fig. 1.



Lateral view, right side; natural size, after being hardened in spirit.

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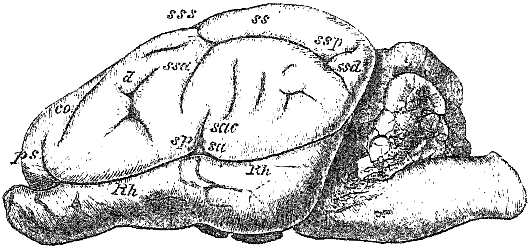
[1] Zeitschrift f. wissensch. Zool. Leipzig, 1878, xxxi. pp. 297–344.

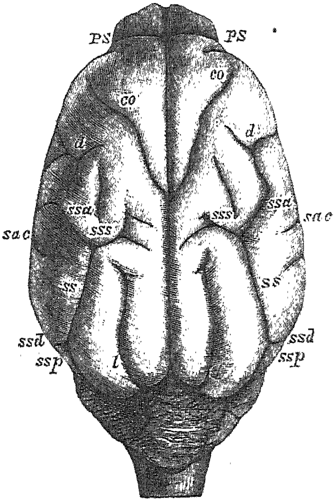
anterior process (*Sa*) running forwards and downwards into the rhinal fissure, while the processus accessorius (*sac*) points backwards and upwards. Rising from the anterior portion of the rhinal fissure and running upwards and forwards is the presylvian fissure (*Ps*), a well-marked fissure symmetrical on both sides. Above the rhinal fissure, and running in a direction more or less parallel to it, is the suprasylvian fissure, which shows a curious asymmetry on both sides (figs. 1, 2, and 3): on the right side (figs. 2 and 3) it begins by the union of two short branches—that nearest the mesial line called the processus posticus (*ssp*), the other, more external, named the processus descendens (*ssd*),—and extends forwards to the line of the sylvian fissure (*ss*); at this point it gives off an ascending branch (*sss*),

Fig. 2.



Lateral view, left side; natural size.

Fig. 3.



View from above; natural size.

which runs up almost to the middle line, and called the processus superior; it then bends downwards and forwards, this portion being called the processus anterior (*ssa*), and is continued forward as the diagonal fissure (*d*). On the left side the suprasylvian fissure is more simple (figs. 2 and 3): it has two posterior branches and an ascending anterior branch as on the right side; it then passes downwards and forwards and terminates. The diagonal fissure (*d*) is quite separate on this side from the suprasylvian fissure. Between the suprasylvian fissure (*ss*) and the longitudinal fissure is a straight fissure, *fis. lateralis* (*l*) (fig. 3). A little anterior to the processus superior of the suprasylvian fissure springs the *fis. coronalis* (*co*) (fig. 3), an important fissure, which runs from the longitudinal fissure and extends forwards and outwards till it nearly meets the rhinal fissure. Besides these principal fissures there are a few of small size present, especially on the right side. A very small speck of the island of Reil is to be seen at the junction of the rhinal and sylvian fissures on each side. The olfactory bulb is of considerable size. In general form and in the arrangements of the fissures the brain is exceedingly like that of *Sus*, especially on the left side.

The *uterus* was seen, on opening the abdominal cavity, to occupy the anterior portion; and on examination was found to be pregnant, containing five young. It resembles that of the Pig.

The *kidneys* measure 5·5 cm. in length, and are surmounted by suprarenal capsules of considerable size.

Conclusions.—The differences found to exist between the animal just described and *Sus scrofa* are very unimportant and few, the chief being the absence in the present specimen of the transverse fold between the gastric cavity and the antrum pyloricum, and of the long Peyer's patch in the intestine, and the presence in the liver of a superficial vena cava, of a small cystic fissure, and its right lateral lobe being considerably larger than the left. Those differences are not sufficient to require the formation of a distinct genus for the animal as has been done by Hodgson, who claims for it the following generic characters as separating it from *Sus*:—a difference of dentition, since in the specimens examined by him the posterior molar was absent, indicating probably that it was the skull of a young animal, and that the tooth had not been acquired (this supposed difference of the molar dentition from that of *Sus*, I have shown does not hold good); the canines not being protruded beyond the lips (a condition which we find to obtain in the male specimen now living in the Gardens); the inner digit being shorter than the outermost (a condition which we find obtains in *Sus scrofa*). Having shown that none of these supposed generic characters exist, and that the animal resembles *Sus* so closely that there is no ground for separating it from that genus, the generic name *Porcula*, by which it has been known since Hodgson first described it, must be abandoned unless hitherto unobserved or at least unrecorded differences should present themselves in the organs yet to be examined which would justify the retention of the name.

5. A List of the Birds collected by Captain A. H. Markham on the West Coast of America. By OSBERT SALVIN, M.A., F.R.S.

[Received June 18, 1883.]

The following list contains the names of the birds' skins collected by Captain Albert Hastings Markham of H.M.S. 'Triumph,' during the time he had command of that ship, when forming one of the squadron of the Pacific Station. From this list the greater portion of the Laridæ have been omitted, as they have already formed the subject of a paper by Mr. Howard Saunders (P.Z.S. 1882, pp. 520 *et seqq.*).

The birds now before us are 149 in number, and were obtained at various points of the western shores of the Pacific from Esquimalt in the north to the Straits of Magellan in the south, including some from the Galapagos Islands and from the island of Juan Fernandez; the greater portion, however, are from the coasts of Peru and Chili.

Amongst those of the former country, I find a species of *Geothlypis*, which appears to me to be undescribed; there is also an example of a fine Albatross, which I have been unable to determine; and another Petrel, congeneric with our Fork-tailed Petrel, requires a name. Besides these novelties, the collection is rich in specimens of Procellariidæ, of which there are representatives of no less than fourteen species in all.

The references given to each species are taken from published memoirs relating to the country where they were obtained, or from some general work on the region to which they belong. Captain Markham deserves the thanks of ornithologists for his industry in amassing so large a collection during the intervals of the many duties involved in the command of a large ironclad in active service. We only hope that his example may frequently be followed.

1. TURDUS MAGELLANICUS, King; Salv. Ibis, 1875, p. 376.

Juan Fernandez, March 1882.

A young bird assuming its second plumage, which is perhaps a shade darker than that of adult individuals from the mainland.

2. TURDUS FLAVIROSTRIS (Sw.); Salv. & Godm. Biol. Centr.-Am., Aves, i. p. 21, t. 3. f. 1.

Acapulco, Mexico.

3. TROGLODYTES FURVUS (Gm.).

Coquimbo, November 1881.

Two specimens resembling other Chilian examples which have been called *T. hornensis* by Lesson (*cf.* Sharpe, Cat. B. Brit. Mus. vi. p. 257).

4. ANTHUS CORRENDERA, Vieill.; Scl. Ibis, 1878, p. 362.

♀. Coquimbo.

5. Siurus auricapillus (L.); Baird, Brew., & Ridgw. N.-Am. B. i. p. 280.

Esquimalt, 1880.

6. Helminthophaga chrysoptera (L.); Baird, Brew., & Ridgw. N.-Am. B. i. p. 192.

Two specimens without labels, probably from Esquimalt.

7. Dendrœca aureola (Gould); Salv. Trans. Z. S. ix. p. 473.

Charles I., Galapagos.

When writing my paper on the birds of the Galapagos Islands, I overlooked the record of the occurrence of this bird on the mainland, Fraser having obtained a specimen at Esmeraldas in 1859 (P. Z. S. 1860, p. 291). We have recently received specimens from the island of Puna; and MM. Jelski and Stolzmann found it at Santa Lucia, in Western Peru (*cf.* P. Z. S. 1877, p. 744).

8. Geothlypis auricularis, n. sp.

Supra olivacea, capite summo cinereo, fronte anguste, loris et regione suboculari nigris, regione parotica saturate oleaginea; subtus læte flava, subalaribus et campterio alari luteis; rostri maxilla cornea, mandibula pallida, pedibus carneis. Long. tota 4·5, *alæ* 2·2, *caudæ* 1·7, *rostri a rictu* 0·68, *tarsi* 0·8.

♂. Callao, Peru, December 1881 (*A. H. Markham*).

Obs. G. æquinoctiali proxima, sed colore oleagineo regionis paroticæ distinguenda.

Capt. Markham's collection contains a single male specimen of this species, which seems different from the closely allied forms, of which *G. æquinoctialis* is perhaps the best known. *G. semiflava*, which is its nearest neighbour, has the whole of the ear-coverts black and no grey on the head. *G. chiriquensis* has the grey head, but the ear-coverts are black.

9. Ampelis garrula (L.); Baird, Brew., & Ridgw. N.-Am. B. i. p. 401.

Esquimalt, 1880.

10. Hirundo erythrogaster, Bodd.; Salv. & Godm. Biol. Centr.-Am., Aves, i. p. 232.

♂. Callao, December 1881.

11. Tachycineta thalassina (Sw.); Salv. & Godm. Biol. Centr.-Am., Aves, i. p. 233.

Two specimens without labels, probably from Esquimalt.

12. Tachycineta meyeni (Cab.); Baird, Rev. Am. B. i. p. 302.

♂. Coquimbo, November 1881.

13. Atticora cyanoleuca (Vieill.); Salv. & Godm. Biol. Centr.-Am., Aves, i. p. 229.

♀. Coquimbo, November 1881.

14. CALLISTE INORNATA, Gould; Scl. & Salv. P. Z. S. 1864, p. 350.

Panama, January 1882.

15. RHAMPHOCŒLUS DIMIDIATUS, Lafr.; Scl. & Salv. P. Z. S. 1864, p. 350.

Panama, January 1882.

16. SALTATOR ALBICOLLIS (Vieill.).

Saltator isthmicus, Scl. & Salv. P. Z. S. 1864, p. 351.

Panama, January 1882.

17. SALTATOR ATRICEPS, Less.; Scl. & Salv. P. Z. S. 1864, p. 351.

Panama, January 1882.

18. CARDINALIS VIRGINIANUS (L.); Baird, Brew., & Ridgw. N.-Am. B. ii. p. 100.

Acapulco, March 1880.

19. GEOSPIZA FORTIS, Gould; Salv. Trans. Z. S. ix. p. 481.

Charles I., Galapagos.

20. PIEZORHINA CINEREA (Lafr.); Scl. & Salv. P. Z. S. 1878, p. 137.

Camarhynchus cinereus, Tacz. P. Z. S. 1877, p. 321.

Payta, Peru.

This species, originally supposed by Lafresnaye, who described it, to be from the Galapagos Islands, is now known as an inhabitant of Western Peru, specimens having been obtained at Tumbez by MM. Jelski and Stolzmann, by Prof. Steere at Sorritos, and now by Capt. Markham at Payta.

21. SPERMOPHILA TELASCO (Less.); Scl. Ibis, 1871, p. 7.

♂. Callao, December 1881.

22. VOLATINIA JACARINA (L.); Tacz. P. Z. S. 1874, p. 520.

♂. Callao, December 1881.

23. CYANOSPIZA LECLANCHERI (Lafr.); Lawr. Mem. Bost. Soc. N. H. ii. p. 277.

Acapulco, March 1880.

24. PHRYGILUS GAYI (Eyd. & Gerv.); Scl. P. Z. S. 1867, p. 322.

♀. Coquimbo, November 1881.

25. PHRYGILUS ALAUDINUS (Kittl.); Scl. P. Z. S. 1867, p. 322.

♂ ♀. Coquimbo, November 1881.

26. DIUCA GRISEA (Less.); Scl. P. Z. S. 1867, p. 322.

♂ ♀. Coquimbo, November 1881.

Talcahuano, 1881.

27. ZONOTRICHIA PILEATA (Bodd.); Scl. P. Z. S. 1867, p. 322.

Coquimbo, November 1881.

28. ZONOTRICHIA GAMBELLI.

Zonotrichia leucophrys, var. *gambeli*, Baird, Brew., & Ridgw. N.-Am. B. i. p. 566.

Esquimalt, 1880.

29. SPIZELLA SOCIALIS (Wils.); Baird, Brew., & Ridgw. N.-Am. B. ii. p. 7.

Esquimalt, 1880.

30. EMBERNAGRA STRIATICEPS (Lafr.); Scl. & Salv. P. Z. S. 1864, p. 352.

Panama, January 1882.

31. HÆMOPHILIA MELANOTIS, Lawr. Mem. Bost. Soc. N. H. ii. p. 277.

Acapulco, March 1880.

32. CHRYSOMITRIS BARBATA (Mol.)

Chrysomitris capitalis, Tacz. P. Z. S. 1874, p. 522.

♂ ♀. Callao, September 1881.

33. SYCALIS LUTEOLA (Sparrm.); Scl. Ibis, 1872, p. 44.

♀. Coquimbo, November 1881.
Talcahuano, 1881.

34. CASSICULUS MELANICTERUS (Bp.); Lawr. Mem. Bost. Soc. N. H. ii. p. 278.

Acapulco, March 1880.

35. ICTERUS MESOMELAS (Wagl.); Tacz. P. Z. S. 1877, p. 223.

Payta, Peru.

36. ICTERUS PUSTULATUS (Wagl.); Lawr. Mem. Bost. Soc. N. H. ii. p. 280.

Acapulco, March 1880.

37. ICTERUS GRACE-ANNÆ, Cass.; Scl. & Salv. P. Z. S. 1878, p. 137.

Payta, Peru.

38. AGELÆUS THILIUS, Scl. P. Z. S. 1867, p. 323.

Coquimbo, November 1881.

39. STURNELLA MILITARIS (L.); Scl. P. Z. S. 1867, p. 323.

Coquimbo, 1881.
♂. Chili.

40. STURNELLA BELLICOSA (De Fil.); Tacz. P. Z. S. 1874, p. 323.

Payta, Peru.

41. CURÆUS ATERRIMUS (Kittl.); Scl. P. Z. S. 1867, p. 323.

♂. Chili.

42. CYANOCITTA STELLERI.

Cyanura stelleri, Baird, Brew., & Ridgw. N.-Am. B. ii. p. 277.

Esquimalt, 1880.

43. CYANOCORAX MYSTACALIS (Geoffr.); Scl. & Salv. P. Z. S. 1878, p. 138.

Payta, Peru.

44. CALOCITTA FORMOSA (Sw.); Lawr. Mem. Bost. Soc. N. H. ii. p. 285.

Acapulco, March 1880.

45. AGRIORNIS LIVIDA (Kittl.); Scl. P. Z. S. 1867, p. 325.

Talcahuano, 1881.

46. LICHENOPS PERSPICILLATUS (Gm.); Cab. & Hein. Mus. Hein. ii. p. 47.

Coquimbo, November 1881.

47. CENTRITES NIGER (Bodd.); Scl. P. Z. S. 1867, p. 326.

♂. Coquimbo, 1881.

48. TODIROSTRUM CINEREUM (L.); Scl. & Salv. P. Z. S. 1864, p. 358.

Panama, January 1882.

49. ANÆRETES FERNANDEZIANUS (Phil.); Scl. Ibis, 1871, p. 179, t. vii. f. 1.

Juan Fernandez, March 1882.

50. ANÆRETES PARULUS (Kittl.); Scl. P. Z. S. 1867, p. 327.

♂. Talcahuano, 1881.

51. CYANOTIS AZARÆ (Naum.); Scl. P. Z. S. 1867, p. 327.

♂. Coquimbo, 1881.

52. ELAINEA ALBICEPS (d'Orb. & Lafr.); Tacz. P. Z. S. 1874, p. 536.

♀. Callao, December 1881.

53. MYIOZETETES TEXENSIS (Giraud); Lawr. Mem. Bost. Soc. N. H. ii. p. 286.

Acapulco, March 1880.

54. Pitangus derbianus (Kaup); Lawr. Mem. Bost. Soc. N. H. ii. p. 286.

Acapulco, March 1880.

55. Pyrocephalus rubineus (Bodd.).

Payta, Peru.

♀. Callao, December 1881.

The Callao specimen is in the dusky plumage not unfrequent in birds of this species from the west coast of Peru.

56. Pyrocephalus nanus, Gould; Salv. Trans. Z. S. ix. p. 492.

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57. Tyrannus melancholicus, Vieill.; Lawr. Mem. Bost. Soc. N. H. ii. p. 288.

Acapulco, March 1880.

58. Heteropelma veræ-pacis, Scl. & Salv.; Lawr. Ann. Lyc. N. Y. vii. p. 473.

Panama, January 1882.

59. Geositta cunicularia (Vieill.); Scl. P. Z. S. 1867, p. 321.

♂ ♀. Coquimbo, 1881.

60. Furnarius longirostris, Pelz.; Ibis, 1881, p. 409.

Payta, Peru.

This bird agrees with our Ecuadorean specimens called *F. cinnamomeus*, Less.; but as it seems doubtful if this name really belongs to this species, we adopt that proposed for it by Herr v. Pelzeln.

61. Cinclodes fuscus (Vieill.).

Chilian Cordillera.

♂. Coquimbo, 1881.

62. Cinclodes nigrifumosus (d'Orb. & Lafr.).

Cillurus nigrifumosus, Tacz. P. Z. S. 1874, p. 526.

San Lorenzo Island, Peru.

63. Leptasthenura ægithaloides (Kittl.); Scl. P. Z. S. 1867, p. 324.

♂ ♀. Coquimbo, November 1881.

64. Dendrornis susurrans (Jard.); Scl. & Salv. P. Z. S. 1870, p. 839.

Panama, January 1882.

65. Picolaptes souleyeti, Lafr.; Scl. Cat. Am. B. p. 166.

Payta, Peru.

66. Cercomacra tyrannina, Scl.; Scl. & Salv. P. Z. S. 1864, p. 356.

Panama, January 1882.

67. Pteroptochus albicollis, Kittl.; Scl. P. Z. S. 1867, p. 325.
♂. Coquimbo, November 1881.

68. Acestrura micrura, Gould, Intr. Troch. p. 92; Tacz. P. Z. S. 1877, p. 327.
Calothorax micrura, Gould, Mon. Troch. iii. pl. 148.
Payta, Peru.

69. Myrtis fanny (Less.).
Calothorax fanny, Gould, Mon. Troch. iii. p. 151.
♀. Lima, Peru.

70. Thaumastura cora (Less.); Gould, Mon. Troch. iii. p. 153.
Rimac, Lima, Peru.

71. Rhodopis, sp. inc.
Payta, Peru, November 1880.
A female specimen which I am not able to determine satisfactorily. It is considerably smaller than *R. vesper*, and may belong to *R. atacamensis*.

72. Eustephanus galeritus (Mol.); Gould, Mon. Troch. iv. pl. 265; Scl. Ibis, 1871, p. 181.
Juan Fernandez.

73. Amazilia pristina, Gould, Mon. Troch. v. pl. 303.
Lima, Peru.

74. Sapphironia cæruleogularis (Gould); Mon. Troch. v. pl. 446.
Colon, Isthmus of Panama.

75. Stenopsis æquicaudata (Peale); Tacz. P. Z. S. 1874, p. 545.
♂ ♀. Callao, September 1881.

76. Picus lignarius (Mol.); Scl. P. Z. S. 1867, p. 328.
Coquimbo, November 1881.

77. Hylotomus pileatus; Baird, Brew., & Ridgw. N.-Am. B. ii. p. 550.
Esquimalt, 1880.

78. Dryocopus lineatus (L.); Tacz. P. Z. S. 1874, p. 546.
Payta, Peru.

79. Colaptes mexicanus; Baird, Brew., & Ridgw. N.-Am. B. ii. p. 578.
Esquimalt, 1880.

80. Centurus elegans (Sw.); Lawr. Mem. Bost. Soc. N. H. ii. p. 294.
Acapulco, March 1880.

81. Momotus mexicanus, Sw.; Lawr. Mem. Bost. Soc. N. H. ii. p. 289.

Acapulco, March 1880.

82. Ceryle cabanisi, Reich.; Tacz. P. Z. S. 1874, p. 547.

♂ ♀. Rio Rimac, Peru, September 1881.

83. Ceryle alcyon; Baird, Brew., & Ridgw. N.-Am. B. ii. p. 392.

Esquimalt, 1880.

84. Ceryle torquata, Tacz. P. Z. S. 1877, p. 328.

Rio Rimac, Peru, September 1881.

85. Crotophaga sulcirostris, Sw.; Tacz. P. Z. S. 1874, p. 548.

♂ ♀. Callao, Peru, September 1881.
Payta.

86. Piaya cayennensis (Linn.).

Paya ridibundus, Lawr. Mem. Bost. Soc. N. H. ii. p. 293.
Acapulco, March 1880.

87. Conurus erythrogenys, Less.; Tacz. P. Z. S. 1877, p. 328.

Payta, Peru.

88. Conurus petzii (Hahn); Lawr. Mem. Bost. Soc. N. H. ii. p. 296.

Acapulco, March 1880.

89. Conurus cyanolyseos, Scl. P. Z. S. 1867, p. 328.

♂. Sandy Point, Straits of Magellan, August 1882.

90. Pholeoptynx cunicularia.

Athene cunicularia, Scl. P. Z. S. 1867, p. 339.
Coquimbo, 1881.

91. Glaucidium nanum (King); Scl. P. Z. S. 1867, p. 338.

♀. Chili.

92. Circus cinereus (Vieill.); Scl. P. Z. S. 1867, p. 330.

♂. Coquimbo, May 1882.

93. Asturina ruficauda, Scl. & Salv.

Acapulco, March 1880.

94. Buteo erythronotus (King); Scl. P. Z. S. 1867, p. 329.
Coquimbo, 1881.

95. TINNUNCULUS CINNAMOMINUS, Sw.

Tinnunculus sparverius, Scl. P. Z. S. 1867, p. 330.

♂. Chili.

Payta, Peru.

The Chilian specimen is a male with the head wholly slate-blue, without any rufous patch.

96. TINNUNCULUS SPARVERIUS, Baird, Brew., & Ridgw. N.-Am. B. iii. p. 169.

Esquimalt, 1880.

97. FREGATA AQUILA.

♂ ♀. Payta, Peru, January 1882.

The specimen marked a male is in the first plumage; the other is in change to the adult dress, dark feathers appearing all over amongst the white ones, showing that the bird was a male and not a female as it is marked.

98. PELECANUS FUSCUS, Gm.; Salv. Trans. Z. S. ix. p. 496.

♀. Payta, Peru, January 1882.

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99. SULA CYANOPS (Sundev.); Salv. Trans. Z. S. ix. p. 496.

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100. SULA VARIEGATA (Tsch.); Tacz. P. Z. S. 1874, p. 554.

Callao Bay, Peru, August 1881.

San Lorenzo I., Peru.

101. PHALACROCORAX GAIMARDI (Less.); Tacz. P. Z. S. 1874, p. 553.

San Lorenzo I., Peru.

102. PHALACROCORAX BRASILIANUS, Bp.; Tacz. P. Z. S. 1874, p. 553.

♂. Paracas Bay, Peru, October 1881.

103. PHALACROCORAX, sp.?

Guadalupe I., 1880.

A female or young bird, probably of *P. dilophus*.

104. ARDEA EGRETTA, Gm.

Herodias egretta, Lawr. Mem. Bost. Soc. N. H. ii. p. 310

Acapulco, March 1880.

105. ARDEA CÆRULEA, Linn.

Florida cærulea, Lawr. Mem. Bost. Soc. N. H. ii. p. 310.

Acapulco, March 1880.

106. BUTORIDES VIRESCENS (Linn.); Lawr. Mem. Bost. Soc. N. H. ii. p. 310.

Acapulco, March 1880.

107. BUTORIDES PLUMBEUS (Sundev.); Salv. Trans. Z. S. ix. p. 497.

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108. NYCTICORAX GARDENI.

Nyctiardea nævia, Lawr. Mem. Bost. Soc. N. H. ii. p. 311.
Acapulco, March 1880.

109. DAFILA BAHAMENSIS (Linn.); Salv. Trans. Z. S. ix. p. 499.

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110. BUCEPHALA ALBEOLA (Linn.); Baird, B. N. Am. p. 797.

Esquimalt, 1880.

111. ERISMATURA FERRUGINEA.

♂. (Locality not given).

112. COLUMBA FLAVIROSTRIS, Wagl.; Lawr. Mem. Bost. Soc. N. H. ii. p. 304.

Acapulco, March 1880.

113. MELOPELIA LEUCOPTERA (Linn.); Lawr. Mem. Bost. Soc. N. H. ii. p. 305.

Acapulco, March 1880.

114. SCARDAFELLA INCA (Less.); Lawr. Mem. Bost. Soc. N. H. ii. p. 305.

Acapulco, March 1880.

115. GALLINULA GALEATA, Licht.; Tacz. P. Z. S. 1874, p. 559.

Callao, Peru, 1881.

116. PORPHYRIOPS MELANOPS, Scl. & Salv. P. Z. S. 1868, p. 461.

Porphyriops crassirostris (Gray); Scl. & Salv. loc. cit.

♀. Coquimbo Lagoon, Chili, November 1881.

117. PARRA GYMNOSTOMA, Wagl.; Lawr. Mem. Bost. Soc. N. H. ii. p. 312.

Acapulco, November 1880.

118. ÆGIALITIS SEMIPALMATA (Bp.); Tacz. P. Z. S. 1874, p. 560.

♂. Paracas Bay, October 1881.
♂. Coquimbo Lagoon, Chili, November 1881.

119. ÆGIALITIS NIVOSA (Cassin); Scl. P. Z. S. 1867, p. 331.

Chili.

120 STREPSILAS INTERPRES (L.); Tacz. P. Z. S. 1874, p. 560.
♂ ♀. Paracas Bay, October, 1881.

121. HÆMATOPUS PALLIATUS, Scl. P. Z. S. 1867, p. 339.
♀. Paracas Bay, Peru, October 1881.

122. HÆMATOPUS ATER, Scl. P. Z. S. 1867, p. 339.
San Lorenzo I., Peru.

123. THINOCORUS RUMICIVORUS, Eschsch.; Scl. P. Z. S. 1867, p. 331.
Coquimbo, 1881.

124. PHALAROPUS FULICARIUS (Linn.); Baird, B. N. Am. p. 707.
♂. Coquimbo Bay, Chili, November 1881.
"A solitary specimen got alongside the ship."
This species has never before been met with so far south on the continents of America, and has not even been recorded from Mexico or Central America.

125. RHYNCHÆA SEMICOLLARIS, Scl. P. Z. S. 1867, p. 339.
♂. Chili.
♂. Coquimbo, Chili, 1881.

126. TRINGA MINUTILLA, Vieill.
Tringa wilsoni, Baird, B. N. Am. p. 721.
Esquimalt, 1880.

127. CALIDRIS ARENARIA (Linn.); Scl. P. Z. S. 1867, p. 339.
♂ ♀. Coquimbo Bay, Chili, November 1881.

128. EREUNETES PETRIFICATUS, Ill.; Baird, B. N. Am. p. 724.
♂ ♀. Paracas Bay, October 1881.

129. HETEROSCELUS INCANUS (Gm.); Salv. Trans. Z. S. ix. p. 503.
Heteroscelus brevipes, Baird, B. N. Am. p. 734.
Acapulco, March 1880.
Not previously noticed from Mexico.

130. TRINGOIDES MACULARIUS (Linn.); Baird, B. N. Am. p. 735.
No label.

131. NUMENIUS HUDSONICUS (Lath.); Tacz. P. Z. S. 1877, p. 330.
♀. Paracas Bay, October 1881.

132. NUMENIUS BOREALIS (Forst.); Baird, B. N. Am. p. 744.
Charles I., Galapagos.
Not previously noticed on the Galapagos Islands.

133. ANOUS GALAPAGENSIS, Sharpe, Phil. Trans. clxviii. p. 469.

Anous stolidus, Salv. Trans. Z. S. ix. p. 504.

Charles I., Galapagos.

The single skin in Captain Markham's collection has unfortunately been injured by cockroaches, and the skin of the top of the head is almost entirely destroyed. A few feathers, however, remain, and these, so far as they go, confirm Mr. Sharpe's view as to the distinctive character of the Galapagos bird.

134. DIOMEDEA BRACHYURA, Temm.; Lawr. B. N. Am. p. 822; Coues, Pr. Ac. Phil. 1866, p. 177.

At sea, lat. 33° N., long. 119° W., March 1880.

135. DIOMEDEA MELANOPHRYS, Temm.; Coues, Pr. Ac. Phil. 1866, p. 181.

Talcahuano Bay, Chili.

136. DIOMEDEA IRRORATA, sp. n.

Supra dorso medio et alis extus fuliginoso-fuscis, dorso antico et uropygio albis nigro transverse variegatis; capite et cervice tota albis, hac supra flavo lavata; subtus abdomine toto griseo-fusco, albo præcipue in pectore et crisso, minutissime irrorato; alis intus quoque albo et fusco variegatis; cauda fusca ad basin alba; rostro flavido, mandibulæ apice corneo, pedibus corylinis. Long. tota 35·0, *alæ* 20·5, *caudæ* 5·5, *rostri a rictu* 6·2, *tarsi* 3·8, *dig. med.* 5·1.

♂. Callao Bay, Peru, December 1881.

The Albatross described above seems quite distinct from any hitherto known. It appears to come next to *D. melanophrys*, having the bill similarly constructed (*cf.* Coues, Pr. Ac. Phil. 1866, pp. 186, 187), but the bill is much longer and the bird larger in all its dimensions, except the tail, which is shorter and more rounded. In coloration, too, there is great difference, the upper back and rump being variegated with dusky and white instead of pure white, and the abdomen wholly dusky with minute white freckles.

137. CYMOCHOREA MARKHAMI, sp. n.

Omnino fuliginosa fere unicolor, capite toto paulo plumbescentiore, tectricibus alarum dilutioribus, cauda profunde furcata, rostro et pedibus nigerrimis. Long. tota 9·0, *alæ* 6·9, *caudæ rectr. med.* 2·6, *rectr. lat.* 3·8, *tarsi* 1·0, *dig. med.* 1·1, *rostri a rictu* 1·0.

♀. Coast of Peru, lat. 19° 40′ S., long. 75° W., December 1881.

Obs. C. melaniæ, Bp., apud Coues, certe similis, sed capite plumbescente, tarsis brevioribus forsan diversa.

This species is certainly very closely allied to *C. melania* of Bonaparte as described by Dr. Coues (Pr. Ac. Phil. 1864, p. 76), but the head of that species is described as being darker on the sides and the region of the eyes as well as the upper parts generally. This can hardly be said to be the case in the present bird, the whole head and throat being rather paler than the body and with a plumbeous rather than a sooty tint.

As in *C. leucorrhoa* the wing-coverts are lighter than any part of the wing; but this species is obviously distinct, having a white rump, as is also the case with Mr. Ridgway's *C. cryptoleucura.*

Captain Markham's collection contains two specimens of this species, which I propose to call after him. Both are marked as females. No species of this genus has been previously noticed in these seas, *C. melania* being from the coast of Mexico.

138. MAJAQUEUS ÆQUINOCTIALIS (Linn.); Coues, Pr. Ac. Phil. 1864, p. 118; Salv. Orn. Misc. i. p. 232.

♀. Coquimbo, Chili, June 1882.

139. PUFFINUS GRISEUS (Gm.); Salv. Orn. Misc. i. p. 236.

Callao Bay, Peru, August 1881.

140. PUFFINUS CREATOPUS, Coues; Pr. Ac. Phil. 1864, p. 131; Salv. Ibis, 1875, p. 376.

♂. Coquimbo Bay, Chili, November 1881.

141. PUFFINUS OBSCURUS (Gm.).

Charles I., Galapagos.
Not previously noticed in the Galapagos Archipelago.

142. THALASSŒCA GLACIALOIDES (Smith); Coues, Pr. Ac. Phil. 1866, p. 30.

♂ ♀. Coquimbo Bay, Chili, November 1881.
♂. Valparaiso, Chili, July 1882.

143. OSSIFRAGA GIGANTEA (Gm.); Coues, Pr. Ac. Phil. 1866, p. 32.

♀. Coquimbo Bay, Chili, November 1881.

144. ŒSTRELATA DEFILIPPIANA, Gigl. & Salvad.; Salv. Orn. Misc. i. p. 255, pl. 33.

♀. Coast of Chili, December 1881.

145. ŒSTRELATA NEGLECTA (Schl.); Mus. d. Pays-Bas, vi. *Procell.* p. 10.

Juan Fernandez, March 1882.

Two specimens in Captain Markham's collection are in all essential particulars so much like one of MacGillivray's examples of *Œ. neglecta* from the Kermadec Is., that I hesitate to separate them. The only differences I can trace are in the coloration of the lower plumage, which, in the Juan-Fernandez examples, is dusky instead of white, and in the inner web of the primaries, except at the tip, being white right up to the shaft of the feather instead of having a dark strip dividing the white portion of the web from the shaft.

One of the Juan-Fernandez birds is rather lighter-coloured beneath than the other, and in this respect approaches nearer to *Œ. neglecta* and shows that there probably exists no definite distinction between the light- and dark-coloured birds. Moreover the dark-coloured specimen has the tarsi and the proximal portion of the digits and the intervening webs dark like the rest of the foot; the other has these parts the normal colour, as found in the generality of *Œstrelatæ*. This fact is of importance as tending to show that the colour of the tarsi and toes cannot always be looked upon as a specific character.

In *R. arminjoniana* the primaries beneath are only white at the base; but this species and *R. neglecta*, I am now disposed to think, are more nearly allied than I formerly believed to be the case (*cf.* Orn. Misc. i. p. 252, pl. 31).

146. DAPTION CAPENSIS (Linn.); Coues, Pr. Ac. Phil. 1866, p. 162.

West coast of South America, lat. 25° S., long. 85° W.
„ „ lat. 20° S., long. 71° W.

147. PELECANOIDES GARNOTI (Lesson); Coues, Pr. Ac. Phil. 1866, p. 190.

♂ ♀. Coquimbo Bay, Chili, November 1881.

I much doubt if there is more than one variable species of this form, which should bear the name of *P. urinatrix* (Gm.).

148. PODICEPS MAJOR, Bodd.; Scl. & Salv. Ex. Orn. p. 190.

♀. Coquimbo Bay, Chili, November 1881.

149. PODICEPS ROLLANDI, Scl. & Salv. Ex. Orn. p. 190.

Talcahuano, Chili, 1881.

6. Further Notes on the Birds of the Argentine Republic By E. W. WHITE, F.Z.S.[1]

[Received June 18, 1883.]

These notes refer to some specimens, which I was unable to determine until I had the opportunity of consulting the collections of Mr. Sclater and Messrs. Salvin and Godman, who have kindly furnished the necessary names.

1. NOTHOPROCTA DOERINGI.

♂. Cosquin, Cordova, Arg. Rep., Aug. 1st, 1882.

Iris reddish brown.

This is the only example of this species that I have met with in the Argentine Republic, where it evidently seems to be rare. It was brought to me alive by a native who had been out on the mountains driving cattle; he told me that they were only to be met with on the highest parts of the Sierras, which are covered with a coarse kind of grass: the elevation would be about 3000 ft. above the sea-level.

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[1] See P. Z. S. 1882, p. 591, et 1883, p. 37.

2. **Bubo virginianus** (Gm.).

♀. Cosquin, Cordova, Arg. Rep., Sept. 1, 1882.

Iris amber.

This bird was brought to me alive, and I managed to keep it for some time; in fact they soon become very tame and tractable, some of the natives keeping them as pets loose about the farmyard. There are a few to be met with in this valley; and once I went a journey of some distance with a friend to the roosting-place of a pair in the highlands near the mountain-ravines; he told me that he had often observed them in some large Algarroba trees.

Our visit was fruitless, but we had ample evidence of their having been there lately. The local name for this Owl is "Quitilipe," evidently given it from its peculiar hooting.

3. **Aramides ypecaha** (Vieill.).

♂. La Plata, Buenos Aires, Arg. Rep., Nov. 2, 1882.

Iris brown.

I obtained my specimen in a fine lagoon near La Plata. I have observed them in other parts of the country, but I do not consider them by any means abundant.

4. **Æchmophorus major** (Bodd.).

♂. La Plata, Buenos Aires, Arg. Rep., Nov. 20, 1882.

Iris amber.

I did not observe many of these birds about this locality.

5. **Upucerthia dumetoria** (Geoffr. et d'Orb.).

♂. Cosquin, Cordova, Arg. Rep., June 19, 1882.

Iris dark brown.

I only obtained two specimens of this species; they were met with in the woodlands, where the trees are rather scattered, forming pretty glades.

6. **Placellodomus sincipitalis** (Cab.).

♂. La Plata, Buenos Aires, Arg. Rep., Nov. 2, 1882.

Iris amber.

This bird I obtained in a wood, in fact in the same locality as the allied species, and no doubt, owing to its similarity, have often passed it over without notice.

7. **Picolaptes angustirostris** (Vieill.).

♂. Cosquin, Cordova, Arg. Rep., June 19, 1882.

♀. Cosquin, Cordova, Arg. Rep., June 21, 1882.

Iris dark.

Not uncommon in the Algarroba woods on the slopes of the mountains.

8. **Sycalis arvensis.**

♀. La Plata, Buenos Aires, Arg. Rep., Nov. 14, 1882.

Iris brown.

Found commonly in flocks on the plains; it makes a pleasant chirping when disturbed; they nest on the ground, under or near a tuft of high grass.

9. Phlœocryptes melanops (Vieill.).

♂. La Plata, Buenos Aires, Arg. Rep., Nov. 14, 1882.
♀. La Plata, Buenos Aires, Arg. Rep., Nov. 6, 1882.
Iris sepia.

These birds are found abundantly about the lagoons, where they may be seen darting about amongst the tall reeds that form a thick mass round the edge of the water; they are rather difficult to distinguish, as they are of a sombre colour and keep well amongst the reeds, only occasionally taking a short flight from one clump to another. I found their nests abundant; rather round in shape, with the aperture near the tip, which is very strong and neatly rounded off. The nest is made of grass supported on three or four reeds joined together for that purpose; it is built about a foot above the water, and is a very neat and strong structure; the interior is nicely lined. I once found two nests together, one on the top of the other; the underneath one was occupied, but that above seemed not to have been quite finished.

Three eggs, in a clutch, of a uniform dull pale-green colour.

Measurement: axis 22 millim., diam. 15 millim.

7. On a Collection of Birds from Yucatan. By A. Boucard, C.M.Z.S. With Notes by Osbert Salvin, M.A., F.R.S.

[Received June 18, 1883.]

From October 1878 to August 1881 Mr. G. F. Gaumer (the well-known American collector of *Amblychila cylindriformis* and other rare insects) traversed various parts of the State of Yucatan, in Mexico, with the object of making collections of natural history. At my request he consented to devote himself particularly to birds and to study their habits. The notes and observations which he has sent me on the general aspect of the country and the habits of the birds collected are so interesting, that I have determined to have them published; and for that purpose I have carefully named all the birds he sent me and have prepared the following list. Among the birds collected by Mr. Gaumer are some great rarities, such as *Meleagris ocellata*, *Chrysotis xantholora*, *Melanoptila glabrirostris*, *Pyranga roseigularis*, *Icterus auratus*, *Cyanocitta yucatanica*, and *Amazilia yucatanensis*, which have been found up to the present time only in Yucatan and in the adjoining countries; but a great number of the species found by Mr. Gaumer are the same as those which I collected myself at San Andres Tuxtla and Playa Vicente, countries situated south of Mexico on the Atlantic side, such as *Crypturus sallæi*, *Penelope purpurascens*, *Crax glo-*

bicera, *Ortyx nigrogularis*, *Melopelia leucoptera*, *Granatellus sallæi*, and others. A few of the others are the usual North-American species found all over America. One species seems to be very abundant near Merida, namely *Eumomota superciliaris*, originally discovered in Nicaragua. I have also received this species from Tehuantepec, from my friend Sumichrast; so that up to this time we may consider the extreme limits, north and south, known for this species to be between Tehuantepec and Yucatan on the north and Panama on the south. I never met with this species in South Mexico. I have been surprised not to find among the birds of Yucatan more of the species of the Antilles, the only exception being *Perisoglossa tigrina*, *Petrochelidon fulva*, and *Zenaida amabilis*. This shows clearly that the bird-fauna of Yucatan has hardly any affinity with that of the Antilles, and that if the promontory of Yucatan has ever been united with the Antilles, it must have been a very long time ago. Even if the island of Cuba has ever been united to the continent, the distance between the coast of Yucatan and the said island being comparatively small, it is rather strange that more species of Yucatan are not found in Cuba, or *vice versâ*. When Mr. Gaumer went to Yucatan, I confess that I was under the impression that he would find there many of the peculiar species of the Antilles; but the years which he devoted in that country to collecting all the species of birds shows clearly that this idea must be given up altogether. Mr. George N. Lawrence, of New York, who purchased the remainder of Gaumer's duplicates, has lately described three supposed new species from this source; these are:—*Leptoptila fulviventris* (so closely allied to *L. albifrons*[1] that I do not admit it as a good species); *Formicarius pallidus*[2] (closely allied to *F. moniliger*), which I consider a good species, because the characters given by Mr. Lawrence are constant; and *Chætura gaumeri*[3], which is closely allied to *C. vauxi*. On this last-named species I cannot give my opinion, not having received any specimens. Although the collection made by Mr. Gaumer is not large, considering the time spent in collecting, it is of great scientific interest in consequence of the great rarities which he met with, some of which were known only by unique specimens, and still more for the notes which he took on the country and on the habits of birds. These notes can be well depended upon, Mr. Gaumer being a very laborious naturalist and a careful observer. All his observations agree exactly with those I made on many of the same species of birds during my different travels in Mexico.

Mr. Gaumer writes as follows about the climate and seasons of Yucatan:—

"I reached Yucatan on the 14th of October 1878, in the first heavy norther of the season. The weather had been good for some ten days before, the summer rains having ceased about ten days (at least upon the coast). During October, November, and December norther followed norther every ten to fourteen days, with light drizzling rain, which generally lasted from two to four days, and with increasing cold, until the thermometer is said to have fallen at one time to 61° Fahr. In January 1879 there were four moderately heavy rainfalls, with strong northers and cold nights. One very heavy rainfall occurred on February 23rd, with a considerable sprinkling of hail. The hailstones were quickly gathered up and placed in bottles in Izamal by many persons, who thought they could be saved. There were five northers, each of which brought light rain. From February 26th to May 23rd no rain fell, and often the sky was entirely clear for weeks at a time, and in fact rarely was a cloud to be seen. The heat in the day gradually increased, until it was almost intolerable in April and May. On account of the dry air and clear sky the radiation was so great that the nights often became disagreeably cool, though generally most delightfully pleasant and balmy. The birds disappeared as the dry season advanced, except a few of the common resident species, which lived about the ranchos and at the aguadas, where water was to be found. On the 23rd of May the first of the summer rains occurred, which was soon followed by daily showers at midday. All nature changed as if by magic; new leaves grew, and the forests were again populated with sweet songsters, which gave life and joy to every thing. In June the rains began at 11 A.M. and ceased at 2 P.M., rarely beginning earlier or continuing later. In July they began at 10 A.M. and lasted until 3 or 4 P.M., but never earlier. In August they began at 10 A.M. and lasted until nightfall, and sometimes later. During these three months there were from five to eight days in each month upon which no rain fell. The heat was almost insupportable even for the natives. Yellow fever raged in most of the interior towns. In September the rains began at 8 or 9 A.M., and often lasted until midnight, and not unfrequently all night. The weather became milder. Insects became exceedingly scarce, and the birds were not fit to skin. Reptiles were about the only things to be found. Mollusks are exceedingly rare in Yucatan: not one species can be said to be common. During the first twenty-seven days of October 1879 rain in torrents fell almost incessantly. The sun was seen on four days, and the stars appeared in patches on five nights. Not five consecutive hours passed during the twenty-seven days without rain. Yellow fever gave place to intermittent and bilious fevers. Insects were rarely seen, and the birds again almost entirely disappeared. The rains seem now to have ceased as they began; whether the rainy season is over remains to be seen. On account of the heavy rains or other cause, the birds which are here now are worthless for skins, as the feathers are not yet grown. *Meleagris ocellata* will probably have its full plumage by December, and will continue in good plumage until June."

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[1] Lawr. Ann. N. Y. Acad. Sc. ii. p. 287.

[2] *Tom. cit.* p. 288.

[3] *Tom. cit.* p. 245.

The chief localities in which birds were collected by Mr. Gaumer are as follows:—

"(1) *Progreso* is the port of Merida, situated on the north coast, six leagues to the east of the old port of Sisal. The country is low and marshy for nearly two leagues inland; and in times of the northers the greater part of this distance is inundated by the rise of the sea, leaving the town of Progreso on a narrow strip of land between the bays and the sea. This neck of land is covered with low shrubs, which furnish but poor protection for the birds in the season of the northers. October and part of November 1878 were spent at Progreso, and the remainder of November at the port of Silam (Tzeelam), twenty leagues to the east of Progreso, which is similarly located in every respect. (2) *Chablé* is a hacienda on the Campeche road, eight leagues south-west of Merida. The land is almost entirely limestone-rock, with a few very low scrubby trees, which rarely rise to the height of twenty-five feet; beneath these is one impenetrable thicket of undergrowth. The month of December was mostly spent in this rancho. (3) *Merida*, the capital of Yucatan, is a large village situated in a forest of shady trees, which by care have become quite large, and in every respect unlike the natural trees about the city. Part of December and half of January 1879 were spent in this city. (4) *Izamal* is situated in the interior, fourteen leagues to the east of Merida. The country is low, level, and stony; thickly wooded with low scrubby trees and a dense growth of underbush and thorns. (5) *Izalam* is a rancho six leagues to the south of Izamal, located in a forest of trees which rise to the height of forty feet. The country is level and rocky, and covered with the usual undergrowth. The remainder of January, February, and half of March were spent in Izamal and Izalam. (6) *Tizimin* is situated fifty leagues to the east of Merida, and sixteen leagues from the north coast. The country, like all Northern Yucatan, is low, level, and undiversified, without streams of water of any kind. This is on the border of what are called the eastern forests. To the north, east, and south of Tizimin lie vast forests, for the most part uninhabited since the emigration of the Indians nearly half a century ago. These forests are filled with ruins both ancient and modern. Of the former nothing remains worth sending out of the country. A few ranchos have been repeopled, and from these I have collected most of the birds sent. Of these the first was (7) *Yok Jonat Ku*, a large forest to the north-east of Tizimin six leagues. Here are large trees and the forests comparatively open. The months of April and May and part of June were spent in this forest and others near by. (8) *Rio Lagartos* is a seaport town at the mouth of the river of the same name. Rio Lagartos is not a river in the sense generally given to the word *river* in Europe and America, but rather an arm of the sea into which open innumerable springs, or, as I believe, large subterranean rivers. The water is very salt, and in the dry season even more salt than the sea. It is very broad and shallow, bordered by a dense growth of low brush, behind which lie marshes of salt or brackish water. Here many thousands of Flamingos were seen in their finest plumage, while vast swarms of other sea-birds are ever in sight. The remainder of June and part of July were spent here, though, on account of the innumerable hosts of mosquitoes and gnats, which come with the first rains, my work was very much impeded. (9) *Calotmul* is situated five leagues to the south of Tizimin in similar lands, though on the road to Merida. (10) *Pocobach* is a new settlemen four leagues south of Calotmul, on the border of the largest forest-trees yet seen in Yucatan. The forests are open and quite penetrable. (11) *Chem Jonat* is a new rancho, three leagues further in this forest; there the collections of August, September, and October were made. The incessant rains and immense floods of water of September and October rendered collecting an utter impossibility; besides the persistent and almost universal intermittent and pernicious fevers made it extremely hazardous to expose one's self to the inclemencies of the weather. The Aguadas are deep excavations in the earth, which are filled with water never very deep. These are said to be natural; but I am of opinion that many of them are artificial, or at least reconstructed by the ancient Maya races. They are of various sizes, but average from fifty to one hundred yards square (or nearly square). The general shape is circular, though I think there is sufficient evidence for believing that they were originally quadrilateral in shape. However that may be, the important point is, that these aguadas, which are abundant in Yucatan, are filled with fresh water all the year. The approach is generally easy for all animals, the sides being inclined. In the dry season immense numbers of land-birds and animals go to these aguadas to drink. Birds and animals of prey find there an abundance of food; and the hunter generally fills his game-bag with choice game in a short time, while the naturalist is generally rewarded by the finding of something good. The *Jonat* (*tsco-not*) or *Senote* is a deep circular opening in the earth, with perpendicular walls of limestone, generally about sixty feet high (in the region of Tizimin, and shallower towards the coast). These are of all sizes and shapes, and are filled with clear, fresh, and cool water. The senote is of *unknown depth*, and believed by the natives to be openings to great underground rivers. There is generally no approach except down the stony walls. The senote is often in an immense underground cave with but a narrow mouth. At the water's edge there is no place to rest, nor visible object in the deep clear waters. When open, large numbers of small birds go to the senote to drink, and especially Finches. The Vultures often build their nests in the rocky walls, also Owls and other similar birds. When closed, or partly closed, or cave-like, the cave over the senote is populated with Swallows, Owls, Bats, and Motmots. Reptiles &c. are also said to abound, sometimes in immense numbers. In the water of every senote that I have ever seen there is at least one species of fish belonging to the Siluroids. These fishes are very abundant, hundreds sometimes being visible at one time. In nearly all of the open and shallow senotes nearer the coast there is said to exist another species belonging to the scaly tribe. I have seen examples of this latter species but twice, and when I was utterly unprepared to capture and preserve them. This general distribution of the Siluroid fishes, and some experiments which I have made, prove conclusively, to my mind, that the theory of underground rivers in Yucatan is an undoubted fact. The surface-water is all swallowed up by these senotes and by the ever thirsty land. There are no rivers nor streams of any kind, nor other source of supply of water than those mentioned, except in the rainy season, when cavities in the rocks are often filled with rain-water. Artificial wells are also dug through solid limestone."

I now add Mr. Gaumer's notes on the species which he has collected[1].

1. TURDUS GRAYI, Bp.; Lawr. Ann. Lyc. N. Y. ix. p. 199; Salv. & Godm. Biol. Centr.-Am., Aves, i. p. 18.

Native name "Ruiseñor." This bird is rather common in all parts of Yucatan, and is much prized as a pet for its sweet song. It is found alike in towns and forests. It utters no cry when approached, and is said to sing only in June. Though I have spent the summer in Yucatan, I have never had the pleasure of hearing this bird sing.

2. GALEOSCOPTES CAROLINENSIS (L.); Lawr. *l. c.* p. 204; Salv. & Godm. Biol. Centr.-Am., Aves, i. p. 26.

This bird is very rare; only a few specimens have been seen, all of which were in the cities of Merida, Izamal, and Tizimin. It is very shy, and frequents low clumps of bushes along the stone fences.

3. MELANOPTILA GLABRIROSTRIS, Sclat.; Salv. & Godm. Biol. Centr.-Am., Aves, i. p. 27, t. 3. f. 2.

Exceedingly rare.

4. MIMUS GILVUS (Vieill.); Salv. & Godm. Biol. Centr.-Am., Aves, i. p. 36.

Mimus gracilis, Lawr. *l. c.* p. 199.

Native name "Chico," or "Zenzontl." The name of "Zenzontl" is generally given in Mexico to all the species of Mocking-birds.

[This is the only species of *Mimus* of which I have seen specimens from Yucatan.—*O. S.*]

5. POLIOPTILA CÆRULEA (L.); Lawr. *l. c.* p. 199; Salv. & Godm. Biol. Centr.-Am., Aves, i. p. 50.

6. POLIOPTILA BILINEATA (Bp.).

♂, Progreso, October 1878.

7. CAMPYLORHYNCHUS GUTTATUS (Gould); Lawr. *l. c.* p. 199; Salv. & Godm. *l. c.* p. 68.

Progreso, Oct. 1878. Iris black.

Rare; only two specimens sent.

8. THRYOTHORUS MACULIPECTUS (Lafr.); Salv. & Godm. Biol. Centr.-Am., Aves, i. p. 92.

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[1] [These have been arranged for convenience according to the order of the 'Nomenclator.' I have also added the references to Mr. Lawrence's paper on the Birds of Yucatan (Ann. Lyc. N. Y. ix.), and the names of several species obtained by Dr. Cabot, whose collection I examined in 1874.—*O. S.*]

9. Thryothorus albinucha (Cabot).

Troglodytes albinucha, Cabot, Pr. Bost. Soc. N. H. ii. p. 258.

Thryothorus albinucha, Lawr. *l. c.* p. 199; Salv. & Godm. *l. c.* p. 94.

Thryothorus petenicus, Salv. P. Z. S. 1863, p. 187.

Chablé, Dec. 1878. Iris black.

This little bird is very common in all the forests of Yucatan, seldom entering the villages or ranchos. Is a lively songster, spending most of its time near the ground. Its song is varied and thrilling, dispelling sadness as if by magic. Its food is small insects and worms.

10. Troglodytes intermedius, Cab.; Lawr. *l. c.* p. 199; Salv. & Godm. *l. c.* p. 100.

11. Siurus aurocapillus (L.); Lawr. *l. c.* p. 200; Salv. & Godm. *l. c.* p. 144.

This bird is common in all the shady forests of Yucatan, but it abounds most on the coast at Silam and Rio Lagartos.

12. Siurus noveboracensis (Gm.); Lawr. *l. c.* p. 200; Salv. & Godm. *l. c.* p. 145.

This bird was only observed in the salt-marshes of Silam. It is probably common in winter on the coast generally.

13. Siurus ludovicianus (Aud.).

14. Mniotilta varia (Linn.).

Izalam.

Common at all times and in all parts. Ever busy climbing about the bark of the trees, upon which it finds most of its food.

15. Parula americana (L.); Lawr. *l. c.* p. 200; Salv. & Godm. *l. c.* p. 119.

Taken at Silam and Progreso in October and November.

16. Protonotaria citrea (Bodd.); Lawr. *l. c.* p. 200; Salv. & Godm. *l. c.* p. 111.

Rare; only three specimens sent.

17. Helminthophaga pinus (L.).

[New to the fauna of Yucatan.—*O. S.*]

18. Perisoglossa tigrina (Gm.).

[New to the fauna of Central America.—*O. S.*]

19. Dendrœca coronata (L.); Salv. & Godm. *l. c.* p. 127.

Common in Izamal in January, seen again in March, and not seen since nor elsewhere.

20. DENDRŒCA ÆSTIVA (Gm.); Lawr. *l. c.* p. 200; Salv. & Godm. *l. c.* p. 124.

21. DENDRŒCA VIEILLOTI (Cass.); Lawr. *l. c.* p. 200; Salv. & Godm. *l. c.* p. 125.

Taken at Silam in November 1878, where it was quite rare and very wild. Seen again in greater abundance in June and July at Rio Lagartos. I conclude that it is a coast-bird, as I have never seen it inland beyond two leagues.

[Dr. Cabot also found this species in Yucatan.—*O. S.*]

22. DENDRŒCA PALMARUM (Gm.).

This bird was only seen at the port of Progreso, where it lives in the low dense clump of under-brush. It is exceedingly shy and difficult to shoot.

[No specimens of this species have been submitted to me. It is known to pass the winter in the Antilles, but has not previously been noticed in Central America.—*O. S.*]

23. DENDRŒCA SUPERCILIOSA (Bodd.); Salv. & Godm. *l. c.* p. 134.

Dendrœca dominica, Lawr. *l. c.* p. 200.

Chablé, November 1878.

24. GEOTHLYPIS TRICHAS (L.); Lawr. *l. c.* p. 200; Salv. & Godm. *l. c.* p. 150.

This bird was only observed at Chablé in November 1878, and subsequently at Progreso.

25. MYIODIOCTES MITRATUS (Gm.); Lawr. *l. c.* p. 200; Salv. & Godm. *l. c.* p. 167.

Izalam, February 1879.

26. SETOPHAGA RUTICILLA (L.); Salv. & Godm. *l. c.* p. 178.

27. GRANATELLUS SALLÆI (Scl.); Salv. & Godm. *l. c.* p. 161.

Several specimens, male and female. This is a rare species, only met with in the forest.

28. ICTERIA VIRIDIS (Gm.); Salv. & Godm. *l. c.* p. 157.

Icteria virens, Lawr. *l. c.* p. 200.

Only one specimen seen in Yucatan.

29. VIREOSYLVIA OLIVACEA (L.).

This bird was taken at Silam in November.

[No specimen sent to me.—*O. S.*]

30. VIREOSYLVIA FLAVOVIRIDIS, Cass.; Salv. & Godm. *l. c.* p. 189.

First seen on May 17th, when it seemed to come in a great swarm after the first light rain of the season. On the 16th, I was all day in the woods and did not see one of these birds; on the 17th there were hundreds of them in all parts. They have been very abundant since.

31. VIREO OCHRACEUS, Salv.; Salv. & Godm. *l. c.* p. 201, t. 12. f. 1.

Taken at Silam and Progreso. I have not retained specimens of these last birds, and do not know whether I have seen them in other parts of the State or not.

32. CYCLORHIS FLAVIVENTRIS, Lafr.; Lawr. *l. c.* p. 200; Salv. & Godm. *l. c.* p. 211.

Not common.

[Obtained by Dr. Cabot.—*O. S.*]

33. AMPELIS CEDRORUM, Vieill.

Izalam, February 1879.

Only one specimen of this bird was seen in Yucatan during the year.

34. PETROCHELIDON FULVA (Vieill.); Salv. & Godm. *l. c.* p. 228.

Common in the cave-like wells called Senotes, and resident in Yucatan.

[This seems to be certainly the same as the bird of Cuba and Jamaica.—*O. S.*]

35. HIRUNDO ERYTHROGASTER, Bodd.; Salv. & Godm. *l. c.* p. 232.

A flock of 50 or more seen flying over an aguada on April 28th, but the species was not met with again during the year, and is probably only migratory.

36. STELGIDOPTERYX SERRIPENNIS (Aud.); Salv. & Godm. *l. c.* p. 237.

Stelgidopteryx fulvipennis, Lawr. *l. c.* p. 200.

Common in February, March, and April; rare at other seasons. Found in the towns and ranchos.

37. EUPHONIA AFFINIS, Less.; Lawr. *l. c.* p. 200.

Native name "Chichimbula." This little bird is very abundant in Merida and the surrounding country. It is sold on the Playa by the hundred at the nominal price of four for a medio real (=three pence). It is highly prized by the Meridanas for its sweet and varied song as well as its handsome plumage. It is easily domesticated. Its food is fruit, and it is passionately fond of ripe plantains. Few birds eat too much; but I have seen this little bird so full of plantains that it could not fly. In confinement they are said to kill themselves by eating plantains. This bird is also found in other parts of Yucatan.

38. EUPHONIA HIRUNDINACEA, Bp.

Native name "Chi-chim-bi-chi-la." This species is not common in Yucatan. It was first seen in Chablé, and also in Izalam and Tizimin. In habits it is much like the preceding, though the two birds are never found together. It is not quite so good a singer as the other.

39. PYRANGA RUBRA (Linn.).

Common near the city of Merida.

40. PYRANGA ÆSTIVA (Gm.).

Valladolid in October, not common. Feeding on Hemiptera.

41. PYRANGA ROSEIGULARIS, Cabot, Bost. Journ. N. H. v. p. 416; Scl. Ibis, 1873, p. 125, pl. 3.

Only two specimens were obtained of this rare species. The female very much resembles the male; but the throat is yellow instead of red. The size is exactly the same.

42. PHŒNICOTHRAUPIS RUBICOIDES (Lafr.).

This bird is quite common in the forests, where it follows the swarms of ants, in search of its food. It is generally seen in flocks of from six to a dozen, and is not wild.

[Also in Dr. Cabot's collection.—*O. S.*]

43. EUCOMETES SPODOCEPHALA, Bp.

44. SALTATOR ATRICEPS, Lesson.

Pyrrhula raptor, Cabot, Bost. Journ. N. H. v. p. 90, t. 12.

This bird is found abundantly in the city of Merida, and is quite common in all parts. It is generally seen in flocks of from 4 to 12. The song of the male is exceedingly sharp, shrill, and piercing; it generally sings at break of day. While living in Izamal a pair of these birds came every morning into a bush at my window, where they sang for half an hour every day, and at their first notes I found myself awakened. This bird mounts to the highest branch of a tree, where it utters a few shrill notes, and again descends to the thick foliage below. Its food is the flowers of the convolvulus when this plant is in bloom; and at other times I have found other flowers and green leaves, or sometimes fruits, in its stomach.

45. SALTATOR GRANDIS, Lafr.; Lawr. *l. c.* p. 200.

This is believed by the natives to be a distinct species, though I am of opinion that it is the female of the preceding. Its habits are the same, though the song is much milder; and of this form I have seen flocks of 70 to 100, while the preceding rarely exceeds 8 or 10.

[In Dr. Cabot's collection.—*O. S.*]

46. Hedymeles ludovicianus (Linn.); Lawr. *l. c.* p. 200.

47. Cardinalis virginianus (L.); Lawr. *l. c.* p. 201.

Common in all parts, quite shy, and always seen in pairs. It is alike prized for its sweet song and for its bright plumage. Its food is mostly seeds. It frequents open lands or the outskirts of the towns.

48. Guiraca cærulea (L.); Lawr. *l. c.* p. 200.

This bird is common from December to May. In Yucatan it is rather stupid, nor has it the beautiful plumage which it generally has in the north in summer.

49. Guiraca parellina, Bp.

Merida, January 1878. Irides black.

50. Spermophila moreleti, Bp.

This little bird was first seen in February, and afterwards in great numbers in May and June. It lives in flocks, and is only seen in open land, often in company with the other species of small Fringillidæ.

51. Volatinia jacarina (L.); Lawr. *l. c.* p. 201.

Very common in the corn-fields near Merida and elswhere.

52. Phonipara pusilla (Sw.); Lawr. *l. c.* p. 201.

53. Cyanospiza ciris (L.); Lawr. *l. c.* p. 201.

Common in all open lands and villages, often seen in the principal streets of Merida, but most common on the coast. It lives among the weeds and low bushes, where it finds its food, which consists chiefly of seeds. Rather rare in midsummer.

54. Cyanospiza cyanea (Linn.).

Progreso.

55. Melospiza lincolni (Aud.).

Large flocks of this little Sparrow were seen in Izamal in January and February. A very few have since been seen in other places. In Izamal it was very tame and quite active, living principally in the hedges and brush-heaps.

[No specimen sent to me.—*O. S.*]

56. Embernagra chloronota, Salvin.

Embernagra rufivirgata γ. verticalis, Ridgw. Pr. U. S. Nat. Mus. i. p. 248.

Embernagra rufivirgata, Lawr. Ann. Lyc. N. Y. ix. p. 201.

Abundant in all parts, always on the ground, where it is ever busy scratching for its food. Generally seen in pairs, rarely mounts high nor flies far, is a good singer, and when hunting for its food it constantly utters its sweet chirp, which fills the woods with joy.

[Mr. Gaumer's skins are a little paler beneath than typical *E. chloronota*, but the difference is but slight.—*O. S.*]

57. CHRYSOMITRIS MEXICANA (Sw.).

Common in the corn-fields.

58. CASSICUS HOLOSERICEUS (Licht.); Sclater, Ibis, 1883, p. 163.

This bird is quite common in the margins of corn-fields and in open places in the forests. Its peculiar wedge-shaped bill is well adapted to its mode of extracting worms. This bird selects a thicket of dead weeds, then mounts the stem of a plant suspected of having a worm inside; with its wedge-bill it splits the weed, and with a twist crushes and tears away the half, thus exposing the enclosed worm. This it does also with the hard limbs of bushes and trees. The muscles of the head are wonderfully developed, and on this account the bird possesses great wrenching force. It lives in Yucatan all the year.

59. ICTERUS AURATUS, Bp.; Lawr. Ann. Lyc. N. Y. ix. p. 271; Sclater, Ibis, 1883, p. 369.

A very rare species; only two specimens obtained.

60. ICTERUS CUCULLATUS, Sw.

Very common in the western towns, but more rare in the eastern. It is found alike in forest, field, and village and is everywhere a favourite bird with the natives. It builds a very long pendent nest.

61. ICTERUS GIRAUDI, Cassin.

Common.

62. ICTERUS MESOMELAS, Wagler.

Oriolus musicus, Cabot, Pr. Bost. Soc. N. H. i. p. 156; Bost. Journ. N. H. iv. p. 465.

Calotmul, June 1880.

Like the last is common in all parts. Its habits are nearly the same.

63. MOLOTHRUS ÆNEUS (Wagl.).

This bird is very abundant in all parts of Yucatan. It lives in flocks, and generally frequents barn-yards and cow-pens. I have frequently seen it perched upon the back of a horse or cow, in order to pick maggots out of old sores. These sores are very prevalent among draught-horses in Yucatan, and wherever there is a sore the flies soon populate it with their larvæ: the sore then spreads, and hundreds of maggots may be extracted from a single sore. In the intolerable laziness and neglect of these people to attend to wounded animals, it seems as if God had sent this bird as a merciful surgeon to clean the foul ulcers of poor helpless brutes. Females were abundant at Chablé in November.

64. AGELÆUS PHŒNICEUS (Wagl.).

Abundant on the coast, where it lives in the salt-marshes. Its habits are well known.

65. STURNELLA LUDOVICIANA (L.).

Common on the savanas of Rio Lagartos, but not seen elsewhere.

66. LAMPROPSAR DIVES, Cab.

Native name "Pich" (pronounced "peach"). This is the commonest of all Yucatan birds, being very abundant in all the towns, as well as in the forests. I have seen this bird walking about in the busiest streets of Merida, apparently without fear, and it often enters houses in search of food.

67. QUISCALUS MACRURUS, Sw.

Native name "Sacoa." This bird is most common here from January to May. I did not see one in July and August, nor in September, and up to the present time, Oct. 15th, the bird has not made its appearance. It does not go in flocks; rarely more than five or six are seen at a time: it apparently sings with very great effort. The female is considered by the natives another species and is called "Socao," instead of "Sacoa."

68. CYANOCITTA YUCATANICA (Dubois).

Cyanocitta crassirostris, Lawr. *l. c.* p. 201.

Native name "Chel." This bird is abundant in all parts of the country, and is often very destructive to the corn-fields and to certain kinds of fruit. It is rather shy, though sometimes seen in the villages. In the country it travels in flocks of from twenty to one hundred. On being approached these birds set up a loud cry, each chattering and squawking as if disputing the right of the invader; and while one or two of the largest, who are perched upon some high object, greet him in a most offended manner, the remainder stealthily fly away; when all are gone, these suddenly give a few laugh-like notes, and quickly follow. When young this bird is pure white, and gradually changes to its adult plumage.

[In Dr. Cabot's collection.—*O. S.*]

69. CYANOCITTA MELANOCYANEA (Hartl.).

Only one specimen of this fine species, killed in the forests near Merida.

[No specimen sent to me. I have never seen this species in the low lands of Guatemala.—*O. S.*]

70. Cyanocorax luxuosus (Less.); Lawr. *l. c.* p. 201.

Peruvian Jay.

Native name "Tzee-tzep." This Jay is abundant in the city of Merida, and quite common in all the towns and villages. It is seldom seen in the forests, though frequently along roadsides. The natives call this bird "jisip" (tzee-seep), which with the Maya pronunciation is exactly the word articulated by the bird. Though very common, it is very little known by the people of Yucatan. This is probably due to the bird resorting to the thick foliage of those trees with a green shade nearest its own.

[In Dr. Cabot's collection.—*O. S.*]

71. Psilorhinus mexicanus, Rüpp.

Corvus vociferus, Cabot, Pr. Bost. Soc. N. H. i. p. 155; Bost. Journ. N. H. iv. p. 464.

This bird is common only in the great forests, is very shy, lives in flocks of twenty or more, rarely descends to the earth; when approached, it utters a loud cry, "*pap*," repeated many times in rapid succession, and then darts away a few hundred yards, when it repeats its cry a few times and then becomes quiet. Its flesh is eaten by the natives.

[In Dr. Cabot's collection.—*O. S.*]

72. Oncostoma cinereigulare.

♂. Tizimin, May 1879. Iris grey.

73. Elainea pagana (Licht.).

♀. Tizimin, May 1879. Iris dark brown.

This bird is very rare; only a few specimens were seen on the 22nd of May, after which I did not meet with it again.

74. Elainea placens, Sclat.; Lawr. *l. c.* p. 201.

Not common.

[Not sent to me.—*O. S.*]

75. Myiozetetes texensis (Giraud); Lawr. *l. c.* p. 201.

The boldest of all the Tyrants, never relaxing in its efforts until it has routed all other birds from its accustomed place at the top of a dead limb. It is exceedingly noisy, uttering a loud shrill cry, which alone is sufficient to put to flight many other birds. It seldom descends to the earth, but often pursues other birds to a great height. While shooting birds on the wing, I have frequently seen this bird dart from its perch, and flap with its wings the falling bird; and on two occasions, when the falling bird was only wounded, the two birds clenched together so firmly that both reached the ground together. Its food is principally insects; but it is also fond of several kinds of fruits.

76. Rhynchocyclus cinereiceps, Sclat.; Lawr. *l. c.* p. 201.

♀. Tizimin, June 1879. Iris white.

Quite common in the east until May; not seen after that time.

77. Pitangus derbianus, Kaup; Lawr. *l. c.* p. 201.

A bold bird, living in the vicinity of the aguadas (artificial ponds), and quite rare. It is very difficult of approach, flying from one side of the aguada to the other. It feeds upon the insects which hover over the water.

78. Myiodynastes luteiventris, Sclat.

Common in May and June, after which time it disappeared.

79. Megarhynchus pitangua (L.); Lawr. *l. c.* p. 201.

"Stachi."

Abundant in all parts of the State. This is a very noisy bird. Its favourite haunt is the point of a dead limb near the top of a tree with open lands around, over which he may fly to capture his favourite insects. This is a bold bird, fighting bravely for his favourite limb when another bird happens to perch upon it. I have found several of these birds with crops well filled with fruit and seeds.

80. Muscivora mexicana, Sclat.; Lawr. *l. c.* p. 201.

Only one specimen seen. Said to be common in Panabá, though several visits to the aguadas brought me no birds. The crest opens transversely and is very beautiful; and as the bird was very tame I had the pleasure of watching it a long time. Its food is insects.

[Not submitted to me.—*O. S.*]

81. Pyrocephalus mexicanus, Sclat.; Lawr. *l. c.* p. 201.

This bird is very abundant on the coast, and at Merida common; not found elsewhere in the interior. Its favourite haunts are low dead bushes, where it may be seen at all times of the day perched upon a dead limb, from which it darts into the air after its prey, which consists of small insects.

82. Empidonax minima.

Merida, Dec. 1878.

83. Empidonax trailli (Aud.).

Izalam, Feb. 1879.

84. Myiarchus lawrencii (Giraud); Lawr. *l. c.* p. 204.

85. Tyrannus pipiri, Vieill.

Tizimin, April 1879.

Common in April and May, after which it disappeared.

86. Tyrannus melancholicus, Vieill.; Lawr. *l. c.* p. 204.

Native name "Stachi." This is the most common of all the Tyrannidæ. It abounds alike in all the towns and forests, is bold and fearless, pursuing its prey even within the houses, fighting the largest Hawks, and especially the Buzzards.

87. Tityra personata, Jard. et Selby; Lawr. *l. c.* p. 204.

Common in April. A few were seen as late as June 1st, after which the species disappeared. A very active and noisy bird, ever on the alert for a passing insect, upon seeing which the bird darts into the air with a scream, and rejoices greatly when successful in the capture.

88. TITYRA FRASERI, Kaup.

This bird has similar habits to those of the former species, but is not so common.

89. HADROSTOMUS AGLAIÆ (Lafr.); Lawr. *l. c.* p. 204.

Very rare; only five specimens (males) were seen during the year. This bird lives in the darkest forests, and utters no cry of any kind. It is solitary in its habits, and neither ascends to the tops of the trees nor descends to the ground. It lives upon insects, which it captures upon the wing. My first specimen was found in Merida in a thicket; but it was afterwards taken in Izamal and again at Tizimin.

[Also in Dr. Cabot's collection.—*O. S.*]

90. PACHYRHAMPHUS MAJOR (Cab.).

This bird is very rare. Only one was seen in Izalam in February; four more were seen in Tizimin in May, and on the road to Rio Lagartos in June. It is not shy; lives only in large forests and very high in the trees. It utters a kind of prolonged mournful *twit*, by which its whereabouts may be determined.

91. ATTILA CITREOPYGIUS, Sclat.

April 1879. Iris red.

This bird is rather rare. It was first seen in Izalam in February, and again in Tizimin in April. It is quite tame, and is found only in the largest forests. It is a very quiet bird, and moves but little and very slowly. It is generally seen upon a dead limb near the ground.

92. SYNALLAXIS ERYTHROTHORAX, Sclater.

The Maya name of this bird is "Tzapatan." It is common in Eastern Yucatan from May to October, and is very tame and active. It lays its eggs in a monstrous nest of large sticks, well laid, with the entrance below and about 18 inches from the eggs. I am of opinion that this bird does not build its own nest, but occupies the deserted nest of some other bird or animal. The natives have a curious belief with regard to the formation of the nest of this bird, which is worth relating. When the "Tzapatan" begins to sing, all the birds of the forest bring a stick to form the nest. The Chom (*Cathartes*) being too large to enter the nest, the Stachi (*Tyrannus*) brings two sticks instead of one. In this way the nest is constructed by all the birds of the forest. But this sounds much like many other ingenious inventions of the Spanish conquerors, and is probably a tale invented for the natives to follow in the construction of their houses.

93. SITTASOMUS OLIVACEUS.

February 1879. Iris black.

Rare, being met with only in Izalam and in Tizimin. This bird is only seen moving about the trunks of trees and mostly upon the smaller limbs, for the climbing of which its tail is remarkably adapted. Each of its tail-feathers is tipped with a sharp spine, which together form a semicylindrical end, and fit exactly to the limbs upon which it generally moves.

94. DENDROCINCLA ANABATINA, Sclat.

Common in the forests only, but not seen near the ranchos.

95. DENDROCINCLA HOMOCHROA, Sclat.

Izalam.

Not common, though occasionally found in all the eastern forests, quite shy and rarely quiet. This bird is generally seen upon the trunks of small trees and bushes, where it finds its favourite food.

96. DENDRORNIS EBURNEIROSTRIS, Lesson; Lawr. *l. c.* p. 201.

Common in all the large forests, but never seen near the ranchos. Ever busy, climbing about the dead trees, from which it tears the loose bark in search of its favourite worms. It is very tame and easily approached. Rarely mounts to the top or descends to the roots of the tree. Its flight is always downward; and on alighting some distance above the ground, it begins to move up until it has searched well the trunk of the tree, then it passes to another.

[Also in Dr. Cabot's collection.—*O. S.*]

97. THAMNOPHILUS DOLIATUS (L.).

Thamnophilus affinis, Lawr. *l. c.* p. 201.

Very rare; the first was met with at Tzalam near Izamal in Jan. 1879. Afterwards it was seen twice in Tizimin. Lives in low bushes, and is very tame.

98. FORMICARIUS PALLIDUS, Lawrence, Ann. N. Y. Ac. Sc. ii. p. 288 (1882).

Not common. I agree with Mr. George N. Lawrence that this species is quite distinct from *F. moniliger*. The description given by Mr. Lawrence agrees exactly with the specimens sent to me.

99. SPHENOPROCTUS PAMPA (Lesson).

Rare in Yucatan. Four specimens of this bird were seen near Izalam, and three afterwards in Tizimin. It lives only in the most distant and secluded forests, and is extremely shy. Its song is not harmonious nor sweet, though it sings and chatters a great deal and very loudly. It was only on account of the great noise made by this bird that I was ever able to see it alive. Like all the Humming-birds, it flies very swiftly, and is never seen a second time.

100. Lampornis prevosti (Less.).

Very rare; only four specimens seen, all of which were killed. It lives only in the loneliest forests, far from the dwellings of man, but is not very shy. Izalam, February.

101. Trochilus colubris, Linn.

Abundant on the coast.

102. Dorycha elisæ (Lesson).

Found only at the port of Progreso, where it is very abundant all the year. I have never seen one of these birds elsewhere. It is a very swift flier, shy and rather noisy. It stops but an instant, and again darts away, so that it can rarely be shot upon the perch.

103. Amazilia cinnamomea (Lesson); Lawr. Ann. Lyc. N. Y. ix. p. 204.

This bird is the rarest of all the Humming-birds yet found in Yucatan. Only one specimen has been seen during the year. This specimen was shot while hovering about some flowers in a very high tree. Its habits are not known to me.

104. Amazilia yucatanensis, Cabot.

Seems to be a very rare species, only four specimens having been sent by Mr. Gaumer.

105. Amazilia devillii (Bourc.).

[Not seen by me.—*O. S.*]

106. Chlorostilbon caniveti (Lesson).

This beautiful little Humming-bird was very abundant in Izalam in January and February.

107. Chætura gaumeri, Lawr. Ann. N. Y. Ac. Sc. ii. p. 245.

Chætura vauxi, Lawr. Ann. Lyc. N. Y. ix. p. 204.

[Not submitted to me.—*O. S.*]

108. Chordeiles texensis, Lawrence, *l. c.* p. 204.

Only once met with.

109. Antrostomus macromystax (Wagl.).

Very common in Merida. Frequents the roads and by-paths; appears in the evening after sunset, and often continues its wanderings all night.

I am not certain that the specimen examined is correctly determined.

110. Nyctidromus albicollis (Gm.); Lawr. *l. c.* p. 204.

This is the most common of all the Caprimulgidæ in Yucatan. It is found in all parts of the country, appearing early and flying all night.

[Not seen by me.—*O. S.*]

111. Campephilus guatemalensis (Hartl.).

This bird abounds in all parts of Yucatan. It frequents the large forests, but is also often seen in the corn-fields pounding away upon the dead trees which abound there. Its cry is sharp and rolling, and may be heard at a very great distance, as well as the sound of its blows upon the dead trees. In the forests it is seldom shy, while in the open lands it is rarely to be approached. I have seen 14 of these birds on one tree, crying and pounding away, until at a short distance off it seemed like a hundred woodmen felling trees and conversing at the same time.

112. Picus scalaris, Wagl.; Lawr. *l. c.* p. 205.

Picus parvus, Cabot, Pr. Bost. Soc. N. H. i. p. 164; Bost. Journ. N. H. v. p. 92.

This bird I have seen in all parts of Yucatan, though it is not at all common. I have met with it both in the towns and in the ranchos. It is not wild. The *iris* is reddish brown.

113. Chloronerpes oleagineus (Licht.).

Very rare; only three specimens were seen during the year.

114. Chloronerpes yucatanensis (Cabot).

Picus yucatanensis, Cabot, Pr. Bost. Soc. N. H. i. p. 164; Bost. Journ. N. H. v. p. 92.

Tizimin, May 1879.

This Woodpecker was first seen at Izalam in February, but only one specimen was met with. Afterwards two birds were seen near Valladolid in September. As all these birds were very noisy, I conclude that the species must be very rare in this State.

115. Centurus dubius, Cabot.

Picus dubius, Cabot, Pr. Bost. Soc. N. H. i. p. 164; Bost. Journ. N. H. v. p. 91.

Centurus albifrons, Lawr. *l. c.* p. 205.

This bird abounds in all parts of Yucatan, and is everywhere dreaded by those who raise cocoa-nuts, for it is said to puncture the shell of the young cocoa-nut in order to drink the milk, and the nut is then spoiled. This bird is most frequently found in the cities and near the habitations of man, but is not uncommon in the larger forests.

The *iris* is red.

116. Centurus rubriventris, Sw.; Lawr. *l. c.* p. 206.

Several specimens of both sexes of this rare species were obtained. I am of the same opinion as Mr. Lawrence as to the validity of this species.

117. Celeus castaneus (Wagl.).

Very rare; only two specimens were seen during the year. This bird has a very strong and peculiar odour, derived from its food, which consists exclusively of a small Hymenopterous insect called the *Uss*. It is solitary, and lives in the deepest part of the forest. The specimens obtained were very tame and were watched for some hours before being shot; they jump nimbly about the trees, and are constantly catching the small insects which seem to be attracted to them by their odour.

118. MOMOTUS LESSONI, Lesson; Lawr. *l. c.* p. 204.

This bird is found in all parts of Yucatan, though it is not abundant anywhere. It lives in the forests, and is seldom seen in the towns or ranchos. It never enters wells nor caves, but breeds in the deserted dens of the Armadilloes and other burrowing animals. These subterranean burrows it cleans out with its own claws and bill, and constructs its nest at the bottom. The trimming of the two middle feathers of the tail is a work performed by the bird, and is not natural. Its song is "moot-moot," uttered twice in rapid succession, and repeated at intervals of one minute.

119. EUMOMOTA SUPERCILIARIS (Sw.); Lawr. *l. c.* p. 204.

Momotus yucatanensis, Cabot, Pr. Bost. Soc. N. H. i. p. 156; Bost. Journ. N. H. iv. p. 466.

This bird is abundant in every part of the State. It lives in wells and in the peculiar caves called "*senotes*." I have seen as many as 100 of these birds issue from a single senote, but more frequently one or two dozen is the limit. This bird abounds in the towns, and all places where there are wells or caves; and although a well is used every day it never deserts its home. Its cry is "*Toh*," uttered with a broad emphasis as "*Tāh*;" hence its name in Maya. This word as uttered by the bird means in Maya "straight," and by the ancient Indians refers to the two long straight feathers of the tail. Its food is frogs and other small animals and insects, which it finds in its subterranean home.

120. CERYLE AMAZONA (Lath.).

[Not sent to me.—*O. S.*]

121. CERYLE CABANISI (Tsch.).

122. CERYLE SUPERCILIOSA (Linn.); Lawr. *l. c.* p. 204.

Rio Lagartos, June 1879.

This little Kingfisher was taken at the sulphur-springs of Rio Lagartos, the only place where it is known to live in Yucatan. As this is a favourite bathing-place for the people of all the interior towns, this little bird has a great celebrity throughout the State. It is very tame, so much so that I have seen it plunge into the water after a fish only a few yards from me while I was bathing. The owner of the springs does not allow these birds to be killed, and it was with difficulty that I obtained permission to shoot one or two.

123. TROGON PUELLA, Gould.

Tizimin, May 1879.

Very rare: only three specimens were seen, and the bird is unknown to the natives. The first time I saw this bird there were two, which I believed to be a pair, though they differed a great deal. This was on May 31st, and on June 2nd I saw another. They were in the forest, and were very tame. They uttered no sound of any kind.

124. TROGON CALIGATUS, Gould.

Very common from May to September; lives only in the forest, is very tame, and spends much of its time singing; is rarely seen very high in the tree, nor does it descend to the ground. Like all the Trogons, it does not change its position upon the limb of a tree when once it alights; and when it flies from a branch it always keeps its back towards the hunter.

[Not submitted to me.—*O. S.*]

125. TROGON MELANOCEPHALUS, Gould.

Not common. I have never seen this bird in more than two localities—first in Yak-Jonat[1] in April, and again in Chemzonot in August. Those of April were only six in number, and those of August 20 or more. Several specimens, male and female, were obtained.

126. CROTOPHAGA SULCIROSTRIS (Sw.); Lawr. *l. c.* p. 205.

Abundant in all parts of the State. Lives in flocks, and flies very clumsily. In cool damp mornings these birds may be killed by dozens, with clubs, and are often captured alive by the hand. There are several species of ants which are accustomed to set out on migratory or foraging expeditions in immense flocks or swarms; these ants are as manna to the "*Crotophaga*." I have seen as many as two hundred birds at a time devouring these insects.

127. GEOCOCCYX AFFINIS, Hartlaub.

Geococcyx mexicanus, Lawr. *l. c.* p. 205.

Rather rare in all parts, except at Rio Lagartos. May generally be seen perched upon the stone fences in the morning, or upon some elevated object; rarely in the trees. When startled it jumps quickly to the ground, and runs away, hiding itself in the thick undergrowth. "Xcum-kumil" is its name in Western Yucatan; in the east the Indians call it "Bachen-choo-lool."

[In Dr. Cabot's collection.—*O. S.*]

128. PIAYA CAYANA (Linn.).

Piaya mehleri, Lawr. *l. c.* p. 205.

"Kip choh."

This bird, which is common in all parts, is a great enemy of the bee-raiser, as its food consists exclusively of these insects. Stationing itself in the vicinity of the hives, or frequenting the trees to which the bees resort to seek for honey, it is ever busy collecting them. It is rather inactive and clumsy, scarcely appearing at ease in any position. Its song is neither beautiful, nor varied, nor often repeated.

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[1] Yak-Jonat is a great forest six leagues north-east of Tizimin, where many birds were obtained. But one rancho exists in a region extending over many leagues.

129. Dromococcyx phasianellus (Spix).

Only one specimen of this bird was seen by me in Yucatan; and as it has no name, neither in Maya nor in Spanish, I conclude it is seldom found in this State.

130. Rhamphastos carinatus (Swains.).

Said to be very common in all parts of the State, though I have not found this to be the case. Only six specimens have been observed by me during the year. It is also said to go in immense flocks, but I have only seen solitary individuals. It lives upon fruits, and is found in the forests, rarely in the settlements, and never in the towns.

[In Dr. Cabot's collection.—*O. S.*]

131. Pteroglossus torquatus (Gm.).

Common in most parts of the State. Lives in flocks in the forests, rarely seen near the ranchos, and never in the towns. Lives upon fruit, of which it is very fond and eats a great deal. It generally takes its food three times a day—at 7 A.M., and at 2 and 5 P.M.; at these hours it is easily shot, as it is not very wild when eating.

132. Conurus aztec, Souancé; Lawr. *l. c.* p. 207.

This bird abounds in all parts of Yucatan; but the largest flocks were met with in Western Yucatan, where 400 or 800 were seen in a single flock. In November and December they were feeding upon the seeds of a plant which grows very abundantly in that part of this State. The sharp piercing cry of these birds is almost deafening when in large flocks.

133. Chrysotis albifrons (Sparrm.); Lawr. *l. c.* p. 207.

This bird abounds in every part of Yucatan, rarely entering the villages, though common near the ranchos, and frequently seen in immense flocks in the wild-orange groves, where it spends much of its time eating the fruit of this tree. This bird is found domesticated in almost every house, and learns to speak quite readily.

[In Dr. Cabot's collection.—*O. S.*]

134. Chrysotis xantholora, G. R. Gray; Salv. Ibis, 1874, p. 327.

This bird seems to be very rare. Only three specimens were sent by Gaumer, who made no special remarks on them, probably believing that they were the same as *C. albifrons*.

[In Dr. Cabot's collection.—*O. S.*]

135. STRIX FLAMMEA, Linn.

This Owl is rather rare in Yucatan, being seen only in Izamal and Tizimin, though it is known to exist in other parts, and I think it is generally distributed. It is found perched upon a large branch of some tree with thick dark foliage. Its note is well represented by its Indian name, "Too-coo-loo-chhoo-oo."

136. SYRNIUM VIRGATUM, Cassin.

[Not seen by me.—*O. S.*]

137. GLAUCIDIUM PHALÆNOIDES (Daud.).

Glaucidium infuscatum, Lawr. *l. c.* p. 207.

♂, iris yellow; Merida, Dec. 1878. This bird is abundant in all parts of the State, lives more in the cities and towns and about old ruins than in the country. It is so tame that the boys often capture it alive with their hands, or with a noose fastened to the end of a stick. In the day it makes a kind of constant clicking noise, which may be heard some distance.

[Not seen by me.—*O. S.*]

138. CIRCUS HUDSONIUS (Linn.).

Not common, only four specimens having been seen during the year. My specimen was shot in February, at Izalam.

139. ASTURINA PLAGIATA (Schl.).

Shot at the aguada of Yok-satz, where it was evidently accustomed to go in search of Pigeons and other birds, which assemble there to drink and bathe. Its flight is more rapid than the latter.

[In Dr. Cabot's collection.—*O. S.*]

140. ASTURINA RUFICAUDA, Scl. et Salv.

Asturina magnirostris, Lawr. *l. c.* p. 207.

This Hawk is not common, only six specimens having been observed during the year. It is very shy, and lives in the open fields generally, but takes to the woods when approached.

[In Dr. Cabot's collection.—*O. S.*]

141. URUBITINGA ANTHRACINA (Nitzsch).

♀, iris brown; Chablé, Yucatan, Dec. 1, 1878. Three specimens of this bird were seen during the year in this State:—the first on Dec. 1, 1878; the second was seen in Jan. 1879, in the city of Merida, where it seemed to be at perfect ease, and without fear of man; the third was seen in an aguada near Espita in March, and was quite tame. This bird utters a faint cry "pip," hence its Indian name.

[In Dr. Cabot's collection.—*O. S.*]

142. SPIZAËTUS MELANOLEUCUS (Vieill.).

"Koss."

Tizimin, ♂, June 6, 1879. Iris golden yellow.

This large Hawk was shot by my friend Dr. Filipe Alcala near his house. I have heard this bird spoken of in all parts of Yucatan, but it has never been my fortune to see one alive.

143. MICRASTUR MELANOLEUCUS.

Falco percontator, Cabot, Bost. Journ. N. H. iv. p. 462.

[In Dr. Cabot's collection.—*O. S.*]

144. ACCIPITER BICOLOR (Vieill.).

Shot at the aguada of Yok-satz in March and May.

145. ACCIPITER FUSCUS (Gm.).

Dec. 1878, Chablé. Only a few specimens of this Hawk have been seen. It is very shy, and frequents thick shady woods, where it flies with rapidity. In its stomach were found only mice.

146. TINNUNCULUS SPARVERIUS (Linn.); Lawr. *l. c.* p. 207.

This little Hawk lives in the old church-towers and ruined buildings. It preys upon the small birds and young chickens which it finds in the cities. Generally one or two pairs may be found in every village. I have never seen it elsewhere.

147. [HYPOTRIORCHIS FEMORALIS.

In Dr. Cabot's collection from Yucatan.—*O. S.*]

148. HYPOTRIORCHIS RUFIGULARIS (Daud.).

Hypotriorchis aurantius, Lawr. *l. c.* p. 207.

149. LEPTODON CAYENNENSIS (Gm.).

♀, Izalam. Iris dark grey.

150. ICTINIA PLUMBEA (Vieill.).

Only two specimens of this fine Hawk were seen in Yucatan, and these were flying over the aguada near Tizimin. One was shot very high in the air, but the other, which was not within gunshot, escaped. Its flight is slow and with set wings whirling in easy and graceful turns.

151. HERPETOTHERES CACHINNANS, Vieill.

[In Dr. Cabot's collection.—*O. S.*]

152. POLYBORUS CHERIWAY (Jacq.)

Polyborus auduboni, Lawr. *l. c.* p. 207.

This Hawk is rather rare in Yucatan, only four pairs having been seen in the year. It is always seen in pairs.

[In Dr. Cabot's collection.—*O. S.*]

153. CATHARISTES ATRATUS (Bartr.).

[Not seen by me.—*O. S.*]

154. FREGATA AQUILA (Linn.).

[In Dr. Cabot's collection.—*O. S.*]

155. [ARDEA RUFA (Bodd.).

Demiegretta rufa, Lawr. *l. c.* p. 210.

Also in Dr. Cabot's collection.—*O. S.*]

156. [ARDEA LUDOVICIANA, Wils.; Lawr. *l. c.* p. 210.]

157. [ARDEA CANDIDISSIMA (Gm.).

Garzetta candidissima, Lawr. *l. c.* p. 210.

Also in Dr. Cabot's collection.—*O. S.*]

158. BUTORIDES VIRESCENS (Linn.).

A very common species.

159. CANCROMA COCHLEARIA.

Taken at Rio Lagartos, where it is common and very tame.

160. PLATALEA AJAJA (Linn.).

The Ajaja is common at Rio Lagartos, where it may be seen in flocks of from four to twenty. Like the Flamingo, it is very tame and easily shot. Its Spanish name is *Chocolatera*.

[Not seen by me.—*O. S.*]

161. PHŒNICOPTERUS RUBER, Linn.

These Flamingoes were taken at Rio Lagartos in June. They were in very beautiful plumage and very abundant. I think I have seen as many as three thousand at one time, at the mouth of the river, where the coast and river are lined every morning for many leagues.

[Not seen by me.—*O. S.*]

162. COLUMBA FLAVIROSTRIS, Wagler.

"Ku-kut-keep."

The Blue Pigeon is abundant in Eastern Yucatan, more rare in the west, where it has probably been much persecuted for its fine flesh, which forms a favourite dish among the natives. It is everywhere exceedingly wild and timorous.

163. ZENAIDA AMABILIS, Bp.

Zenaidura yucatanensis, Lawr. Ann. Lyc. N. Y. ix. p. 208.

[This seems to me to be identical with the West-Indian-Island species, as I cannot distinguish Mr. Gaumer's specimens from those from Cuba and Jamaica.—*O. S.*]

This Dove is quite common at Rio Lagartos, and occasionally seen at Progreso. From this I conclude that it is a common coast bird. I have never met with it more than one league inland. It is easily domesticated, and is found in many houses.

164. MELOPELIA LEUCOPTERA (Linn.); Lawr. *l. c.* p. 207.

This bird abounds in all parts of Yucatan. In the dry season thousands of them congregate in the vicinity of an aguada to drink. From ten o'clock until four they line the shore and are very tame; at other seasons they are more solitary, and often very shy.

165. CHAMÆPELIA RUFIPENNIS, Bp.; Lawr. *l. c.* p. 207.

This little Dove abounds in all parts, is quite tame, and often becomes half domesticated.

166. LEPTOPTILA ALBIFRONS, Bp.

Leptoptila fulviventris, Lawr. Ann. N. Y. Ac. Sc. ii. p. 287.

This bird is found in all parts of the State, and is generally quite shy. Though often seen searching for its food in the roads, it is more properly an inhabitant of the more lonely forests, where its cooing may be heard all day long in its own peculiar half sad, half cheerful tone. Its nest is built upon an inclined or falling branch of a tree, and is composed of a few small sticks to prevent the two small white eggs from falling to the ground. This bird is much prized for its flesh among the better sportsmen of Yucatan.

These Yucatan birds have the rufous tint of the underparts slightly darker than is usual in Guatemalan examples; but the difference is too slight to be considered of specific value.

167. CRAX GLOBICERA, Linn.

A very shy bird, living far in the interior of uninhabited forests. Its walk is cautious and almost noiseless; it is generally found in pairs, though the males often travel alone. It spends most of its time upon the ground, where it finds its food by scratching among the leaves. In the morning and evening it mounts upon the trees which bear its favourite fruit, to feast upon the best fruits of the forest. It ascends not by a single flight, but by shorts flights from limb to limb, until it reaches the fruit. While there it makes no noise; but at every moment it listens for the approach of an enemy, which once discovered, it utters a short impatient cluck and flies away to a very great distance. The song resembles the deep distant bass roaring of the Tiger, or the gentle blowing in the bunghole of a barrel. The flesh of this bird is highly valued as food; but the bones are always carefully kept away from the dogs and cats, as they are said to be very poisonous. It is sometimes domesticated, though it rarely lives beyond a few months.

168. PENELOPE PURPURASCENS, Wagl.

The "*Cojolito*" (in Maya, "*Kosh*") is abundant only in certain localities. I know of but one forest in Yucatan (Yak-Jonat) where this bird is found; but in this forest I think I have seen 800 or more. It is very shy, lives mostly upon the trees, where it feeds upon fruit and flowers, as also, in times of scarcity, of fruit upon leaves and buds. On discovering a tree laden with its favourite fruit, it utters a loud yell, which is a signal for all the 'cojolitos' in the forest. In a moment, from every part of the forest come the yells of dozens of other individuals; and soon the tree is covered with these birds, and in a few minutes it is stripped of its fruit, and the cojolitos fly away to return no more. It has been my fortune twice to be beneath the tree when these birds were feeding. The first time I counted 84 birds in one hour and a quarter. The second time 51 birds were in the tree, when I shot and brought down eight. The flesh is eaten, though it is much darker and more solid than that of the Kambool.

[In Dr. Cabot's collection.—*O. S.*]

169. Ortalis vetula, Wagl.

Ortalida maccalli, Lawr. *l. c.* p. 209.

"Cha-cha-la-ca."

This bird spends most of its time in the trees, where it lives upon the fruit, flowers, and tender leaves. Its neutral green plumage renders it very difficult to spy out the bird. When disturbed it jumps to the ground to ascertain the nature of its danger, gives one or two long leaps, and again mounts upon a limb, from which it quickly flies from one branch to another until it escapes in the distance. In the male the trachea is wonderfully prolonged beneath the skin of the breast and abdomen almost to the anus, whence it returns and enters the chest at the proper place. With this great trumpet-like instrument the bird makes a peculiar noise, which may be heard at a league's distance. The song is harsh and sonorous, and never produced alone; but after each part the female, with a finer shriller voice, repeats it in such rapid succession, that it seems like one bird doing the whole. The usual time of singing is in the morning and evening, but it frequently sings at other hours.

[In Dr. Cabot's collection.—*O. S.*]

170. Odontophorus lineolatus, Licht.

This bird is common in all the eastern forests, where it is much esteemed for its fine flesh and as a household pet. As a pet it is not a success, living but a few months in confinement. Like the Quails, this bird lives upon the ground, where it is always seen in pairs. At nightfall it sings a very pretty song, beginning with a low whistle, which is three times repeated, each time with greater force; then follow the syllables *che-va-lieu-a* repeated from three to six times in rapid succession. The tone is musical, half sad, half persuasive, beginning somewhat cheerful, and ending more coaxingly. From its colour and its habit of remaining immovable while one is passing, this bird is somewhat difficult to see. I have frequently seen this bird squatting close to the ground while I passed within a few feet of it. It seldom flies, and never flies far when compelled to take wing.

171. ORTYX NIGROGULARIS, Cabot.

Ortyx nigrogularis, Cabot, in Stevens's Trav. in Yucatan, i. App. p. 474; Pr. Bost. Soc. N. H. i. p. 151.

Chablé. Always seen in flocks or in pairs, sometimes in the darkest forests, but more usually in corn-fields. The flesh of this bird is delicious.

[In Dr. Cabot's collection.—*O. S.*]

172. MELEAGRIS OCELLATA, Cuv.; Cabot, Pr. Bost. Soc. N. H. i. p. 73; Bost. Journ. N. H. iv. p. 246.

In Maya, "Kutz."

The Spanish name of this bird is *Pavo del Monte*. It is occasionally seen within five leagues of Merida, but cannot be said to be common west of Espita. East of Espita it is often seen in the corn-fields in small flocks of from six to ten. I have recently discovered a locality, ten leagues to the north and east of Valladolid, where it may be said to be common. This is the region depopulated since the emigration of the Indians nearly half a century ago; no one lives there now, and the *Meleagris* is the proud ruler of the forest. It is one of the wildest and shiest of birds, extremely cautious in its movements, and ever on the alert for a hidden enemy; it flies with the greatest rapidity at the sight of man, regardless of distance. When met with in open land it takes flight, rising with a heavy flutter peculiar to the family, and after mounting a few yards sails away with set wings to such a distance that the hunter never cares to follow. During the breeding-season, which is in May and June, the male makes a peculiar drumming noise, very deep and sonorous; after this he utters his peculiar song, which resembles the rapid pecking of a distant Woodpecker or the song of the great Bull Toad. On discovering a dreaded object, he utters a peculiar cluck and glides away with a proud movement, which seems to defy the world; and if the object moves, he darts away with headlong speed. The natives believe that this bird sees the image of its enemies in its plumage even before they are visible to the eye of the bird. However this may be, it is a bird of extraordinary caution and vision. Its flesh is held in the highest esteem by the natives, who hunt it unceasingly on this account. In Merida a specimen sells from $1 to $2 dressed; and from $8 to $1 when alive. It is not easily domesticated, and rarely lives more than a few months.

Mr. J. Gaumer has sent me a very fine series of this species, both sexes, in all sorts of plumage. At my request he also sent me some fresh eggs, which I gave to a hen for hatching, but the result was *nil*. I strongly recommended him to procure birds alive and bring them to Europe, but he has not been able to do so.

[In Dr. Cabot's collection.—*O. S.*]

173. GRUS FRATERCULUS, Cass.

Only one seen in Yucatan. This specimen was shot at an aguada near Tizimin in March.

[Not seen by me.—*O. S.*]

174. [ARAMIDES AXILLARIS, Lawr.

In Dr. Cabot's collection from Las Bocas de Silan.—*O. S.*]

175. [ARAMIDES ALBIVENTRIS, Lawr.

In Dr. Cabot's collection from Las Bocas de Silan.—*O. S.*]

176. PARRA GYMNOSTOMA, Wagl.

Very common everywhere near the lakes.

177. [HIMANTOPUS NIGRICOLLIS.

In Dr. Cabot's collection.—*O. S.*]

178. CALIDRIS ARENARIA (Linn.); Lawr. *l. c.* p. 210.

Common at Progreso.

179. STERNA MAXIMA, Bodd.

Very abundant on the coast.

180. RHYNCHOPS NIGRA, Linn.

Very common on the coast, where many thousands of these birds may be seen at any time at the mouths of the rivers.

181. CRYPTURUS SALLÆI, Bp.

"Perdiz" (Spanish name).

The Perdiz is common in most parts of Yucatan, and very abundant in the east. Its flesh is highly prized for food, being very fine and savoury. In the dry season this bird may often be seen in great numbers drinking water at the aguadas, and along the roadsides in the heat of the day, where it is easily shot. It is the sport of the boys of the ranchos to go out at 4 P.M. with stones to kill Perdizes; and those who aim well rarely return unrewarded. It is never seen upon the trees, but is a good runner, rarely taking wing, except when hard pressed. Its song is a single, loud, short, flute-like whistle, uttered at intervals of one or two minutes in the morning and evening. This bird is found domesticated in many houses; it is said to rid the premises of the dreaded Alacranes (scorpions).

[In Dr. Cabot's collection.—*O. S.*]

November 20, 1883.

Prof. Flower, LL.D., F.R.S., President, in the Chair.

The Secretary read the following reports on the additions made to the Society's Menagerie during the months of June, July, August, September, and October, 1883:—

The total number of registered additions to the Society's Menagerie during the month of June was 177, of which 39 were by birth, 52 by presentation, 48 by purchase, 8 by exchange, and 30 were received on deposit. The total number of departures during the same period by death and removals was 122.

The following are of special interest:—

1. A fine young female Ourang-outang (*Simia satyrus*), presented by J. M. Vermont, Esq., of Batu Kawan Estate, Penang, June 7th. Mr. Vermont informs me that this animal, which is in fine condition, and appears to be just changing its teeth, was captured in Acheen, Sumatra.

2. A fine King Penguin (*Aptenodytes pennanti*), brought home from the Falkland Islands, and presented by R. C. Packe, Esq., June 14th.

3. A Cape Ant-Bear (*Orycteropus capensis*), purchased June 25th. This animal is apparently in excellent condition, and seems likely to do well.

The registered additions to the Society's Menagerie during the month of July were 139 in number; of these 72 were acquired by presentation, 22 by purchase, 2 by exchange, 27 by birth, and 16 were received on deposit. The total number of departures during the same period by death and removals was 93.

The most noticeable additions during the month were:—

1. A Rough-billed Pelecan (*Pelecanus trachyrhynchus*), from Mexico, purchased July 3rd, being the first example of this species which we have received.

The bird, of which I exhibit a coloured sketch by Mr. Smit (Plate XLVI.), was in full breeding-plumage on its arrival, and bore on its culmen the characteristic knob which distinguishes the species; this knob has been since shed.

2. A male and two female Babirussas (*Babirussa alfurus*), from Celebes, presented by Dr. F. H. Bauer, C.M.Z.S., and received July 23rd.

One of the female Babirussas produced a young one shortly before the termination of the voyage home, which has reached England safely in company with its mother.

I exhibit a coloured drawing of this little animal, by Mr. Smit (Plate XLVII.). It will be observed that the young Babirussa is nearly uniform in colour, and does not exhibit any of the stripe-marks which usually distinguish the immature forms of the Suidæ.

The total number of registered additions to the Society's Menagerie during the month of August was 138; of these 54 were acquired by presentation, 44 by purchase, 11 by birth, 7 by exchange, and 22 were received on deposit. The total number of departures during the same period by death and removals was 88.

The following are of special interest:—

Two young Mule Deer (*Cariacus macrotis*), born in the Gardens, August 12th, from the specimens presented to the Society by Dr. J. D. Caton, C.M.Z.S.

This is believed to be the first instance of the breeding of this fine American Deer in Europe.

The total number of registered additions to the Society's Menagerie during the month of September was 109; of these 65 were acquired by presentation, 26 by purchase, and 18 were received on deposit. The total number of departures during the same period by death and removals was 92.

The total number of registered additions to the Society's Menagerie during the month of October was 146, of which 11 were by birth, 60 by presentation, 38 by purchase, 3 by exchange, and 34 on deposit. The total number of departures during the same period by death and removals was 88.

The following are of special interest:—

1. Four Ural Phrynocephales (*Phrynocephalus helioscopus*), from the eastern shores of the Caspian Sea, presented by Dr. A. Strauch, F.M.Z.S., October 6th. These interesting Lizards are new to the Society's Collection.

2. A young female Chimpanzee, purchased October 24th, which seems perhaps referable to the form named by M. Du Chaillu *Troglodytes calvus* (Proc. Boston Soc. of Nat. Hist. vol. vii. p. 296). The head is very sparingly covered with hairs, the ears are longer and more prominent than in the ordinary Chimpanzee, and the hands and feet are black.

The Secretary also called attention to the opening of the Society's New Reptile House which had taken place on Saturday, 4th August last, and explained the mode in which the specimens had been arranged in the new building.

The large cases on the north side had been assigned to the Boas and Pythons, those on the west to the Venomous Snakes, and those on the east to the Colubrine Snakes. The Lizards and smaller objects were mostly arranged in the small glass cases along the south front.

It was proposed to add, next spring, a special collection of British Reptiles and Batrachians, which could be conveniently placed in the porch of the building.

The Secretary read a list of the Reptiles and Batrachians living in the Society's collection on October 1st, showing a total of 211 specimens of the former and 51 of the latter class.

The Secretary took this opportunity of calling attention to the increase in size and weight of the young male African Elephant (*Elephas africanus*) which had taken place during the past year. When purchased in July 1882 this animal was 4 feet in height, and weighed 7 cwt. 0 qrs. 4 lb. On the 8th October last the height was found to have increased to 4 feet 11 inches, and the weight to 13 cwt. 2 qrs.

A letter was read from Mr. G. B. Sowerby, Junr., relating to his paper on five new species of Shells read before the Society on the 16th January, 1883.

Mr. Sowerby proposed to change the name of *Thracia jacksonensis* given in this paper (see P. Z. S. 1883, p. 30) to *Thracia brazieri*, the former name having been previously given to another species described in the 'Journal of the Linnean Society' by Mr. Edgar A. Smith.

The Secretary read the following extract from a letter addressed to him by Mr. W. H. Ravenscroft, dated Colombo, 6th July, 1883:—

"I have lately noticed a fact new to me, though possibly well known to students of natural history, in regard to the Spotted Deer as it is called here (*Cervus axis*). We have five or six in an enclosure near the house; and a short time since one of the does gave birth to a fawn. On the second day after the birth I noticed, at about 4.30 in the afternoon, that the doe was quietly feeding by herself, and that the fawn was nowhere within sight. I went into the enclosure to search, and took five or six servants with me; we carefully hunted the ground within the enclosure, about a quarter of an acre, which is bare of any bushes except at one end, where there are a few clumps of cinnamon bushes and one biggish tree; we also hunted the ground outside the enclosure, as I thought that possibly the fawn might have got out through the fence, as it might readily have done. The search, however, was entirely fruitless. Next morning the fawn was with its mother. I set a man to watch; and one afternoon he told me that he had watched the doe and fawn into the bushes, and that the doe alone came out. It would seem that the doe put the fawn to bed every afternoon, for about eight or ten days, at about 4.30 P.M., and hid it so successfully that though I knew within a few feet the place in which it was, I never succeeded in finding it."

The Secretary exhibited, on the part of Major C. H. T. Marshall, F.Z.S., a specimen of a new Impeyan Pheasant from Chumba, N.W. India, which Major Marshall was shortly intending to describe under the name of *Lophophorus chumbanus*: also a partial albino of *Lophophorus impeyanus*, and two other skins of males of the same species in interesting stages of plumage.

Mr. H. E. Dresser, F.Z.S., exhibited and made remarks on some Ringed Pheasants from Corea, which appeared to be intermediate between the Chinese Pheasant (*Phasianus torquatus*) and the Formosan form of the same bird.

Mr. Seebohm exhibited an example of a new species of Owl from Yezo, the north island of Japan, which he proposed to call *Bubo blakistoni*. It was most nearly allied to *B. coromandus* from North India, which it resembled in general style of coloration; but was much larger, and had the toes entirely bare of feathers, thus forming a link between the genera *Bubo* and *Ketupa*.

Prof. F. Jeffrey Bell, Sec. R.M.S., exhibited some specimens of a small undescribed species of ten-armed *Antedon* from the neighbourhood of Port Stephens, which had been placed in his hands by Mr. E. P. Ramsay. These were remarkable for the large number of egg-cases on them, which, at first sight, closely simulated the parasitic *Myzostomata*.

The following papers were read :—

1. On the Characters and Divisions of the Family *Delphinidæ*.

By William Henry Flower, LL.D., F.R.S., Pres. Zool. Soc., &c.

[Received November 10, 1883.]

In few groups among the higher animals has our knowledge made greater advances during the last twenty years than in the Cetacea. The materials for their study contained in our museums have considerably increased, and the literature devoted to them has expanded to a great extent. Many valuable and solid contributions have been made to the knowledge of the anatomy of various species and groups, contributions which will always remain as fixed points gained, from which no retreat will ever be required. There has also been a great amount of imperfect and hasty compilation, and attempts at systematizing, based upon erroneous conceptions of affinities and imperfect anatomical knowledge, which have thrown a haze over the subject, often most difficult to penetrate.

Only two attempts have been made during this time by original workers of recognized authority, who have had ample materials at their disposal, to assemble together the main facts bearing upon a general revision of the classification and nomenclature of the genera and species of the group. It is to these two that all who commence the study of the Cetacea have to look for guidance.

1. The magnificent work of Van Beneden and Gervais[1]. This professedly only treats of the osteology of the Cetacea, but other parts of the subject are necessarily included, if only incidentally. Splendid and valuable as are the illustrations, and full as are the descriptions of the skeletal characters, the zoological portion of the work is by no means so thorough and exhaustive as might be wished. Perhaps intentionally, owing to the difficulties of the subject, and the still insufficient state of knowledge, there is a vagueness about the classification and nomenclature used which is often disappointing to those who hope to find an authoritative statement upon these subjects from authors of such eminence. Owing to the lamented death of Professor Gervais (who had undertaken the portion of the work containing the Odontocetes) having occurred before his task was completed, the group to which the present notes chiefly relate, the true Dolphins, which occupies the last part of the work, is the least satisfactory in its mode of treatment.

2. The other work, which has exercised a still wider influence upon the state of knowledge of the zoology of the Cetacea, is the Catalogue, with its Supplement, of the specimens in the British Museum by the late Dr. J. E. Gray, based upon his famous memoir on the Cetacea, comprised in the Zoology of the Voyage of the 'Erebus' and 'Terror' (1846), and on a series of memoirs which have appeared at different times in the Proceedings of this Society. Of Dr. Gray's extraordinary energy in collecting specimens and in bringing together from all available sources the references which make his works so useful, and also of his acute perception of minute distinctions apt to be overlooked by an ordinary observer, I cannot speak without praise; but unfortunately his tendency to multiply divisions and impose names almost at random, his want of accuracy in description, and his defective anatomical knowledge, are exhibited in his writings on this group in their fullest development. Individual peculiarities, or such as are the effects of immaturity (as in *Benedenia*, *Meganeuron*, &c.), or of accidental mutilation (*Sphærocephalus*), or of mistaken impressions gathered from imperfect photographic representations (*Macleayius*), are made the foundations of generic distinctions, which are maintained in successive catalogues and lists, notwithstanding the exposure of the errors upon which they were based. Specimens between which no one else finds any specific distinction are placed in different genera, as *Megaptera longimana* and *Poescopia lalandii*, *Sibbaldius borealis* and *Rudolphius laticeps*, *Kogia macleayi* and *Euphysetes grayi*, *Hyperoodon butzkopf* and *Lagenocetus latifrons*, *Leucopleurus arcticus* and *Electra acuta*, and many others. Even the same individual specimen occurs twice over in the same list in two different genera, as in the case of *Grampus affinis* and *Globiocephalus affinis*, both founded upon one skull in the Museum of the College of Surgeons.

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[1] 'Ostéographie des Cétacés vivants et fossiles, comprenant la description et l'iconographie du Squelette et du Système dentaire de ces animaux ainsi que des documents relatifs à leur histoire naturelle,' par MM. Van Beneden et Paul Gervais. 1 vol. quarto; and Atlas of 64 plates, folio. Paris 1869–1880.

Yet in default of any other convenient systematic work, Dr. Gray's Catalogue is constantly referred to, and his names and views of affinity are becoming so deeply rooted in zoological literature, that it appears time that an attempt should be made to supply something upon a more scientific basis, at all events to afford those who have not the means of examining the original types, upon which the Catalogue was mainly founded, some idea of what these types really are, and of the extent to which his divisions seem justified by the facts upon which he based them.

In the present communication I have confined myself to the family *Delphinidæ* as defined in the article MAMMALIA in the 'Encyclopædia Britannica,' vol. xv. p. 398 (1883), or the Toothed Whales, which remain after separating the *Physeteridæ* (containing the Cachalots and the Ziphioids), and the three aberrant genera *Platanista*, *Inia*, and *Pontoporia*. This family is a perfectly natural one, containing a very large number of species, the main outlines of whose anatomical structure are essentially alike, but which present numerous modifications in small details. Among them there are certain forms, easily separated by well defined characters, and of which the structure is sufficiently known to permit of their being definitely characterized as forming divisions which may be considered as of generic value. These are *Monodon*, *Delphinapterus*, *Phocæna*, *Neomeris*, *Orcella*, *Orca*, *Pseudorca*, *Globiceps*, *Grampus*, and perhaps *Feresia*, of which the skull only is at present known. After the separation of these, there is still a large residuum of species, too heterogeneous to constitute a single genus, but never yet satisfactorily divided into natural groups, unless the fifteen generic and subgeneric divisions of Dr. Gray's final revision contained in the 'Supplement to the Catalogue of Seals and Whales in the British Museum' (1871) can be considered as such.

It is to this residuum of the Dolphins, which in the article in the 'Encyclopædia' above referred to is left in the old genus *Delphinus* in preference to adopting divisions the value of which at that time I had not had the opportunity of testing, that I have mainly addressed myself in the present communication. For this purpose I have made as full an examination as the time at my disposal afforded of all the specimens in the British Museum, including the types of all Dr. Gray's genera and species, as also of those in the Museums of Paris, Leiden, the College of Surgeons of London, Cambridge University, and in several minor collections.

The collections now being made in America I have had unfortunately no opportunity of examining personally, except in so far as they are represented in the United-States department of the International Fisheries Exhibition of the present year; but I am greatly indebted to the kindness of the Commissioners for the facilities they have afforded me in studying these, and in comparing them with European specimens.

I am very far from thinking that the result of this examination has led to any thing like a complete knowledge of even the main outlines of the classification of this difficult group. Even for a study of the characters of the known species the materials at present available are very insufficient, and doubtless there are many species still to be discovered. I trust, however, that something will have been done to clear the way for future work; at all events I have avoided adding to the existing confusion by introducing a single new name. It seems to be the rule with some zoologists to assume that any newly found individual, especially if in a new locality, belongs to a new species, to name it, and to leave for others to prove its identity with already described forms. The opposite view, that a species should not be considered distinct unless some definable and tangible character can be shown in which it differs from others, appears to me to be preferable, and therefore, following Prof. Van Beneden, the highest living authority on the Cetacea, I have abandoned the old assumption, upon which so many new species were founded, which limited the geographical area of each species to a small and circumscribed portion of the ocean, and placed imaginary barriers to its distribution where none really existed.

Species founded upon osteological characters alone are, of course, not of the same value as those based upon a full knowledge of the external characters, habits, &c. Probably many sections which among other groups of animals we should call distinct species are united by this method; but still, when the only certain information we possess of their structure is derived from their bones, as in the case of so many Cetaceans, no other course can be followed. It is, however, not so much to specific distinctions that this research has been directed, as to discover the mutual relations of the different modifications of the Dolphin type to one another, and their association into groups which may be considered (following the custom adopted in the arrangement of other groups) of generic value.

It will be necessary to precede the examination of the special groups by some preliminary observations applicable to all, upon variations of form depending upon age, sex, and individual peculiarity, the study of which has been hitherto too much neglected, and of which our knowledge is unfortunately still imperfect.

In all Dolphins the form of the skull alters considerably with age, the rostrum or beak becomes larger in older animals, being both longer and wider in proportion to the brain-case. The teeth become actually larger, in consequence of a more considerable portion of the broad base of the crown rising out of the alveolus as the slender apex wears away, and they become more distant from each other through the growth of the maxillary bones.

Thus the proportions of length and width of beak, and number of teeth in a given space (so much used by Gray to distinguish species) cannot be relied upon, except in comparing *perfectly adult* animals; and when the skull alone is present, it is extremely difficult, if not impossible, to tell the relative age of the individual, as, contrary to what takes place in many other mammals, the sutures of the cranium close very early in Dolphins. Even of the basilar suture, which in Seals for instance is only united in old age, no traces are left in Dolphins about three-quarters grown, and in which the epiphyses are all free on the vertebræ and the bones of the limbs, and of which the carpus is but very imperfectly ossified. Want of appreciation of this circumstance has led to many errors in the discrimination of the species of this group.

Sex also appears to exercise an important influence upon the form of the skull, although very little attention has hitherto been paid to this important question, owing chiefly to the difficulty of obtaining a sufficient number of adult specimens of which the sexes are known. Fischer[1] has, however, recently published some extremely interesting observations upon the sexual differences of the skulls of two of the species most frequently met with on the French coast, differences which will probably be also found in other members of the group. In *Delphinus delphis* he found that in the male the rostrum is more elongated, more regularly tapering forwards, and less dilated in its middle portion. The external borders of the intermaxillaries are subparallel to the corresponding borders of the maxillaries. The crests of the cranial bones are more elevated, the temporal fossa more ovoid, and the whole cranium rather higher. In the females the rostrum has a more triangular form, the triangle of the intermaxillaries is more dilated at its base, the apex of the rostrum is less slender, the temporal fossa is broad and rounded.

In *Delphinus tursio* corresponding differences were observed. In the males the rostrum is longer and relatively narrower; the intermaxillaries are more prominent and convex, especially in their posterior half; in this region the external border of the maxillaries is almost parallel to the corresponding portion of the intermaxillaries; the crests of the cranium are more elevated, and less sloping laterally. The heads of the females are remarkable for the breadth of the rostrum at its base and its middle part; the rostrum consequently has a more triangular form; the intermaxillaries are more flattened; the external border of the posterior portion of the maxillaries is not parallel to the external border of the intermaxillaries, but it has a rounded projection outwards. The cranium of the female is relatively a little broader than that of the male; its height is the same in the two sexes. The mandible is a little more elongated in the male.

Such differences as these are, it will be observed, quite as great as many upon which Dr. Gray has founded distinct species.

No dependence can be placed upon the exact number of the teeth in discriminating species. In the first place there is often a great difficulty in counting the teeth of the skulls met with in museums, as, especially in those species in which they are numerous, they become extremely small at the ends of the series, particularly in front, and are often lost or concealed in the gum. And when circumstances permit of their exact enumeration, variations in number are often met with, even in different sides of the same jaw. The range within which the numbers may vary in a single species has been recorded by Fischer, in the memoir cited above, in *Delphinus delphis*, and will be referred to again when speaking of that species.

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[1] "Cétacés du Sud-Ouest de la France" (Actes de la Société Linnéenne de Bordeaux, t. xxxv. 1881).

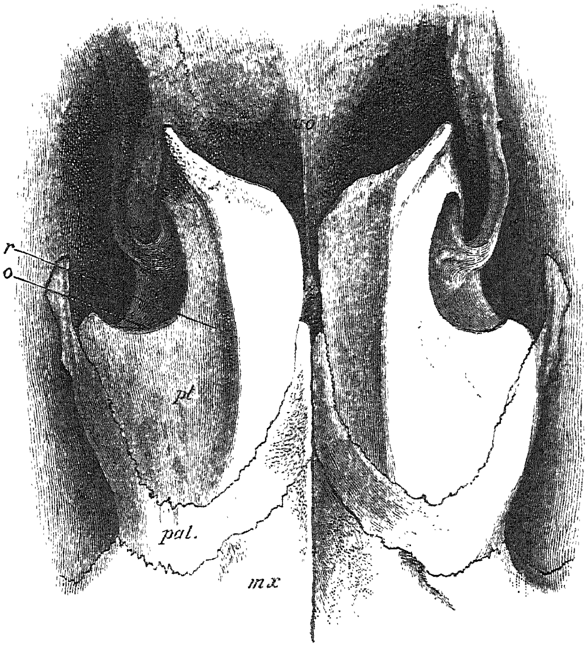

Fig. 1. Posterior part of the osseous palate of *Globiceps melas*, showing a very general arrangement of the pterygoid bones in the *Delphinidæ*. *mx.* maxillary bone; *pal.* palatine bone; *pt.* pterygoid bone; *r.* its reflected inferior lamina, enclosing the great post-palatine air-sinus, the opening into which is *o*. This and all the following figures are drawn one third of the natural size.

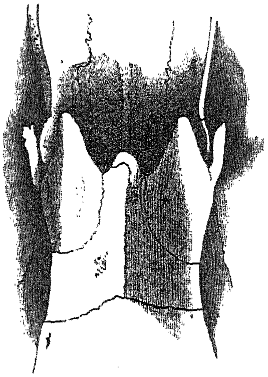

Fig. 2. Posterior part of osseous palate of *Phocæna communis*. The pterygoid bones are comparatively little developed and far apart. A portion of the vomer, of irregular form, is seen in the middle line, behind the palatine bones. Though generally present, this bone varies considerably in form and extent in different individuals.

In the same memoir are also valuable observations upon the differences observed in the number of the vertebræ and ribs, as well as in the external coloration of different individuals, which deserve careful consideration, and as opportunities occur further development and corroboration.

Besides the usual distinctive characters derived from the length and form of the rostrum and the number and size of the teeth, the condition of the pterygoid bones, though hitherto much neglected, seems to me one of great importance in separating the different groups of Dolphins. The remarkable involution of this bone, by which it encloses a large air-sinus opening behind between the outer and inner laminæ (see fig. 1), is peculiar to the family *Delphinidæ*, and is possessed by all its members. Sometimes, in what may be considered the most typical forms (as in *Delphinus* as now restricted (fig. 9), *Tursio* (fig. 5), *Steno* (fig. 6), &c.), the bones are large, and come into apposition in the middle line by straight surfaces of considerable extent. In others, as *Phocæna* (fig. 2), *Monodon*, *Delphinapterus* (fig. 3), they are small and widely separated, having the posterior apex of the palatine bones wedged in between them in front and a

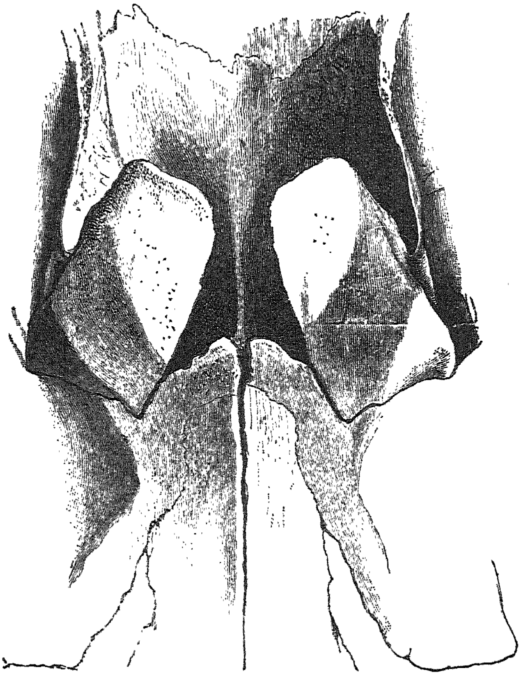

Fig. 3. Palate of *Delphinapterus leucas*. The pterygoid bones are widely separated in the middle line, and of comparatively simple form, the air-sinus between their laminæ being very little developed.

wide open space behind. Between these forms are several intermediate conditions.

After the separation of the genera named on p. 468, it is possible to discriminate among the remainder at least seven distinct types, apparently worthy of generic designation, the characters of which will now be considered.

CEPHALORHYNCHUS.

Cephalorhynchus, Gray, Cat. Cetacea Brit. Mus. p. 106 (1850).

This name may be applied to a group of small-sized Dolphins, which appear to be characterized externally by an obtusely triangular (not falcate) or rounded dorsal fin, small, ovate, or oblong pectoral fins, and rather short rounded snout without groove separating a distinct beak. Both externally and in some of their osteological characters they resemble the members of the genus *Phocæna*.

In the skull the rostrum scarcely exceeds half the entire length, is broad at the base, and gradually tapering, with convex lateral borders. The palate is smooth, that is, without the deep, lateral, longitudinal grooves characteristic of the genus *Delphinus* as now restricted. The pterygoid bones are short and separated from one another by a considerable interval. The outer edges of the premaxillæ form a prominent elevated ridge on each side of the anterior end of the narial aperture. The upper surface of the rostrum itself is very smooth, and evenly rounded from side to side, the surface of the premaxillæ in this region being flat and not distinctly elevated above the maxillæ. The teeth are small (less than 3 millims. in diameter[2]), 25 to 30 in number in each side of each jaw. Vertebræ: C. 7, D. 13, L. 15, C. 30 or 31; total 65 or 66.

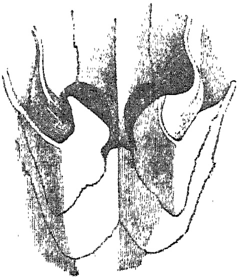

Fig. 4. Palate of *Cephalorhynchus heavisidii*[1].

The type and best known species of this group is that described by Gray (from a stuffed specimen formerly in the Museum of the College of Surgeons, now in the British Museum), in the 'Spicilegia Zoologica' (p. 2, 1828) under the name of *Delphinus heavisidii*. It is from the Cape of Good Hope, and is about 4 feet long, with rather a peculiar distribution of colours, the greater part of the surface being black, but with very distinct "white markings beneath, consisting of a transverse band in front of, and a triangular spot behind each of, the pectoral fins; and of a longitudinal line on the belly, which separates just beneath the dorsal fin into three equal forks, the central one of which is continued in its direct course, while the lateral ones extend obliquely up the sides."

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[1] This figure is from the "Ostéographie des Cétacés" of Van Beneden and Gervais, pl. xxvi. fig. 1 A. All the others are from specimens in the Museum of the Royal College of Surgeons.

[2] This measurement is in the antero-posterior direction, at the base of the crowns of the largest teeth in the middle of the series.

These colours are no longer to be distinguished upon the specimen. The dorsal fin is low and triangular, its base measuring $6\frac{1}{2}$ inches, its height 3, its anterior edge 5, and its posterior edge 4 inches; the latter is nearly straight. The caudal fin is of a crescentic form, not deeply excavated in the middle behind. The pectoral fins are small, and rather ovate than falcate in form.

Two skeletons referred to this species, both from the Cape, are contained in the Leiden Museum, and there is one at Oxford; there are also a skeleton and four skulls at Paris; but it is at present not represented by osteological specimens in the British Museum.

The vertebral formulæ of these skeletons are as follows:—Leiden, No 1—C. 7, D. 11 (two pairs of ribs probably lost), L. 18, C. 29 = 65. Leiden, No. 2—C. 7, D. 13, L. 15, C. 30 = 65. Oxford—C. 7, D. 13, L. & C. 46 = 66. Paris (according to Gervais), C. 7, D. 12, L. 17, C. 26 = 62 (probably not complete). The skeletons appear all to be those of rather young animals, and are all between 4 feet and 4 feet 2 inches long. The skulls vary in length from 270 to 293 millim. The numbers of the teeth of the different individuals are $\frac{28}{25}$, $\frac{27}{26}$, $\frac{29}{29}$, and $\frac{30}{30}$. Of the four skulls in the Paris Museum now assigned to this species, and which certainly appear alike, one has no locality; one is from the Cape and is marked "*D. capensis*, F. Cuvier, Dussumier, 1827;" one is "Des mers de la Nouvelle Zélande, 1841, Hombron;" and the fourth from "Otago (Mr. Hutton), Voyage de M. Filhol."

As the skull remains concealed in the skin of the type of this species, now in the British Museum, I do not know the reasons for which these skeletons and skulls were originally referred to it, but, judging by what can be seen of the teeth of that (probably young) individual, there seems no need to doubt the identification.

In the 58th part of the 'Histoire Naturelle des Mammifères,' bearing the date of September, 1829, Fréd. Cuvier describes and figures the external characters of a Dolphin brought from the Cape of Good Hope by M. Dussumier. In general form and size, and in the characters of the dorsal fin, it bears a considerable resemblance to Gray's *D. heavisidii*; but its colour is said to be entirely black, except a white spot (not shown in the figure) on each side. The name of "Marsouin du Cap," *Delphinus capensis*, is assigned to it[1]. I presume it is to this specimen that the skull in the Paris Museum marked "*D. capensis*, F. Cuvier, Dussumier, 1827," but now assigned to *D. heavisidii*, belongs. The same animal appears in

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[1] This is not the *D. capensis* of Gray's 'Spicilegia Zoologica,' p. 2 (1828).

F. Cuvier's 'Histoire Naturelle des Cétacés' (1836), at p. 158, under the name of *D. cephalorhynchus*. It does not appear that an animal having exactly the coloration ascribed to this individual has been met with again; and as, allowing for imperfections of the drawings, it agrees very closely in form with *D. heavisidii*, it may be considered as only a variety (perhaps melanism) of that species.

A full and accurate description of a Dolphin, of which the skin was brought from the Cape of Good Hope by M. Verreaux, is quoted by Fréd. Cuvier (*op. cit.* p. 161), from a manuscript by M. Quoy, under the name of *D. hastatus*. Cuvier recognizes its identity with Gray's *D. heavisidii*, but does not adopt the name, although it clearly has the right of priority as to publication. In the same chapter in which he quotes Gray's 'Spicilegia' (published eight years before), he says:—"Voici la description manuscrite que nous trouvons de la main de M. Quoy, et que nous ne sachions pas avoir été publiée."

With the same disregard for priority, Rapp ('Die Cetaceen,' p. 37, 1837) has the species *Delphinus hastatus*, Fr. Cuvier, giving *D. heavisidii*, Gray, and *D. capensis*, Dussumier, as synonyms. His figure is from a specimen in the Museum of Stuttgart, and is an improvement upon that of Gray, except perhaps as to the form of the head and mouth. The colouring, well shown in the figure of the under surface (plate iii. fig. B), agrees exactly with the descriptions of Gray and Quoy.

A better figure of unquestionably the same animal, from a drawing by Castelnau, has been given by Van Beneden (Bull. de l'Acad. Roy. de Belgique, 2me sér. t. xxxvi. No. 7, juillet 1873) under the erroneous name of *Orca capensis*, Gray, although its specific identity with *Delphinus heavisidii* and *D. hastatus* is admitted.

In a valuable paper on the "Whales and Dolphins of New Zealand," published in the Transactions of the New-Zealand Institute for 1872, vol. v. (1873), Dr. Hector describes the external and some of the osteological characters of a Dolphin, apparently one of the commonest in the seas around New Zealand, under the name of *Electra clancula*, upon the supposition that it was identical with the *Lagenorhynchus clanculus* (afterwards *Electra clancula*) of Gray, described from a skull alone. The vagueness of Dr. Gray's description may be a sufficient excuse for this determination; but it was altogether an erroneous one, as it is evident that the New-Zealand animal is not an *Electra* or *Lagenorhynchus* at all, but belongs to a totally different group of the family. The figure of the under surface of the skull (Trans. N.-Z. Inst. vol. ix. pl. xi.) shows the separated and diverging pterygoid bones, and all the characters of the present section. Unfortunately the numbers of the vertebræ are not given.

In size the animal differs little from *C. heavisidii*, fifty-one inches being given as its length. Hutton (Trans. N.-Z. Inst. ix. p. 350) gives four to five feet. The slight sketch of the external form given by Hector (which Hutton characterizes as "not good") shows considerable similarity to the previous figures of *D. heavisidii*, but is peculiar in the deep indentation between the lobes of the caudal fin, and especially in the dorsal fin being rounded in outline, unlike that of any other known Cetacean, but rather resembling the adipose fin of a Salmon on a large scale. Hutton simply describes the dorsal fin as "truncated." Both Hector and Hutton describe the distribution of the white markings on the black surface as in *D. heavisidii*, but with this striking difference, that in the New-Zealand animal the "nose and forehead is pure white," bounded by a crescent of black behind the blowholes. The teeth also appear to be more numerous, being usually 31 and sometimes 32 on each side of each jaw. A statement made by Dr. Hector that "the cervical vertebræ are ankylosed into a solid mass, 1·3 inch in length," is also very important, but requires elucidation and confirmation.

An important contribution to our knowledge of the animals of this group has been lately made by the publication by Van Beneden (Bull. de l'Acad. Roy. de Belgique, 3me sér. t. i. no. 6, juin 1881) of a description and figure of the external characters, with osteological details, of a "Nouveau Dauphin de la Nouvelle-Zélande," which, misled by Hector's identification of the common *Cephalorhynchus* of the seas around that land with Gray's *Electra clancula*, he has named *Electra hectori*. But the description of the skull, the form of the pterygoid bones (a drawing of which Prof. Van Beneden has most obligingly sent me), and especially the number of the vertebræ, show that it is widely removed from the *Lagenorhynchi*, and must enter into the group of *Cephalorhynchi*. In fact Van Beneden says that "la tête est parfaitement conformé à celle qui est représentée sous le nom de *Cephalorhynchus heavisidii* ('Ostéographie,' Atlas, pl. xxxvi. fig. 1)." He further states:—"Si nous comparons le dessin du crâne et du corps avec les figures publiées par M. James Hector sous le nom de *Electra clancula*, nous trouvons une similitude presque complète avec cette espèce: le crâne offre exactement la même conformation et les dents se correspondent par le nombre comme par la forme." The dorsal fin has almost exactly the same rounded form, though with less elevation, and the caudal fin the same deep indentation between the widely divaricated lateral lobes. The coloration appears only to differ in the upper and anterior part of the head and beak being black instead of white, as in Hector's specimens. In this we have a return to the original figures of *D. heavisidii* and *D. hastatus*. From Rapp's figure of the latter, however, Van Beneden's differs in the under surface of the chin and throat being white instead of black. The teeth are $\frac{30}{27}$, the largest being 2 millim. in diameter. The vertebræ are C. 7, D. 14, L. 15, C. 27; total 63. The atlas and axis are united, the remainder of the cervical vertebræ free. The manus is narrow, the first and fifth digits being quite rudimentary. The following are the numbers of the elements of each digit, including metacarpals:—I. 1., II. 6, III. 4, IV. 3, V. 1; the individual described was, however, very young, being only 3 feet 6 inches in length, and therefore all the phalanges may not have been ossified.

Such is at present all the material available for the history of these interesting Dolphins. The various individuals described, some from the Cape of Good Hope, some from New Zealand, all present strong points of agreement as to size, form, cranial characters, number of vertebræ and of teeth, and general distribution of surface colouring. They obviously form a natural group; but before we can determine whether to consider them as forming one or more species, we require to know how far the differences hitherto pointed out depend upon errors of observation and imperfect description and delineation, and how far upon individual or sexual variation. It must be noted that hitherto all the Cape specimens recorded have obtusely triangular dorsal fins, while those from New Zealand have had the same organ of a rounded outline. If the two forms should prove to be distinct, the name *C. heavisidii*, Gray, will be retained for the former, while *C. hectori* (Van Beneden) will be adopted for the latter, which may or may not include Hector's so-called *Electra clancula*. If the distinctive characters of the latter should prove to be valid, it will require a new name.

A form evidently closely allied, as far as cranial characters tell, is that represented by a skull in the British Museum, from the coast of Chili, to which Dr. Gray gave the name of *Delphinus eutropia* (P. Z. S. 1849, p. 1), and subsequently erected into the type of his genus *Eutropia*, under the designation of *Eutropia dickiei*. Although a second, smaller, and younger skull of the same form has since (in 1881) been received by the Museum from the same locality, nothing is as yet known of its external characteristics, or of the remainder of the skeleton. Specific distinction from *C. heavisidii* may readily be found in greater size (its extreme length being 360 mm.), longer and narrower rostrum, and larger and rather more numerous (30 to 32) teeth. It must be borne in mind, however, in making this comparison, that all the skulls of *C. heavisidii* hitherto examined seem to belong to immature specimens, and that the original "*Eutropia dickiei*" of the British Museum is apparently that of a perfectly adult animal. The form of the pterygoid bones (broken in the type specimen, but preserved in the younger one), however, though of the same general type, is appreciably different from that of those of *C. heavisidii*. They are longer from before backwards, and their inner edges, though never in contact, are more nearly parallel, and thus approach more nearly to the normal type of the Dolphins. The palate of the larger species also is laterally contracted in front of the pterygoid bones in a manner not seen in the smaller one.

Pending the discovery of further evidence as to the characters of this species, I see no reason to separate it generically from *Cephalorhynchus*, and it should therefore bear the name of *C. eutropia*.

TURSIOPS.

Tursio, Gray, Zool. 'Erebus' and 'Terror,' p. 37 (1846).

Tursiops, Gervais, Hist. Nat. des Mammifères, ii. p. 323 (1855)[1].

The type of this group is *Delphinus tursio* of Bonnaterre and Cuvier, so named because it was supposed to be the *D. tursio* of Fabricius, a very doubtful identification, especially since, as I am informed on the high authority of the late Professor Reinhardt, no specimens of this species have ever been sent from Greenland, its range in the northerly direction not extending so far. It is frequently met with in the seas around the British Isles, and its external and osteological characters are now very well known. I have given a figure of its external appearance in the Trans. Zool. Soc. vol. xi. pl. i., and have observed the same coloration in several other specimens, including the one which was exhibited at the Westminster Aquarium last September. Fischer's description, taken from specimens captured on the west coast of France, is different. He says:—"Tout le corps est d'un noir intense, à l'exception d'une bande ventrale étroite, d'un gris clair chez le mâle, d'un blanc pur chez la femelle." Schlegel has figured one from the coast of Holland which appears to be quite black; but whether this was the original colour

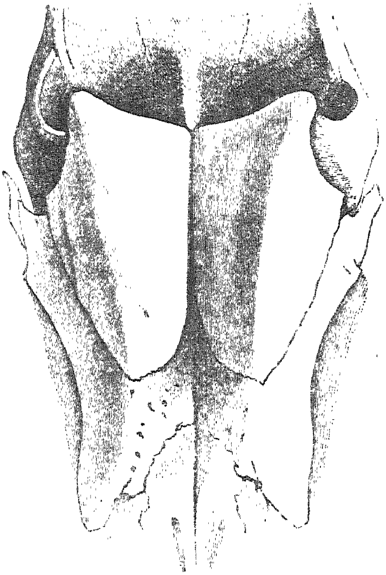

Fig. 5. Palate of *Tursiops tursio*.

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[1] "Afin d'éviter toute méprise, nous appellerons *Tursiops* et non *Tursio* le genre auquel le Nésarnak ou *Tursio* sert de type, quoique M. Gray l'appelle *Tursio*, mais sans faire attention que le genre *Tursio*, proposé antérieurement par Wagler, a pour unique espèce un animal tout à fait différent, le Delphinaptère de Péron."—Gervais, *loc. cit.*

or that acquired by the specimen after being stuffed and dried he does not say (Abhandlungen aus dem Gebiete &c., i. 1841).

This section includes the largest members of the group, of stouter build than most of the others. The snout or beak is short, but distinctly marked off from the prenarial adipose elevation by a V-shaped groove. The pectoral fin is of the typical lanceolate form, and the dorsal fin high and falcate. The skull has no lateral grooves on the palate. The rostrum tapers moderately from base to apex. The pterygoid bones are of the normal form, and united in the middle line (see fig. 5). The symphysis of the lower jaw is short. The teeth number from 21 to 25 on each side of each jaw. They are large (the largest measuring 6 to 7 mm. in antero-posterior diameter at the base of the crown). Their summits (at least in British specimens) are commonly worn off in old individuals.

An examination of a number of skeletons from European seas, in various museums, proves that the usual vertebral formula is C. 7, D. 13, L. 17, C. 27; total 64[1]. Not unfrequently in skeletons, apparently complete, there are but 63 vertebræ present, and in one in the Leiden Museum but 62. In another specimen in the same collection there is a fourteenth rib present on the right side only. In one at Bordeaux there are 13 ribs on the right side and 14 on the left. The chevron bones are 21 in number. The number of phalanges (including metacarpals) of the digits of the manus are respectively I. 1, II. 7, III. 6, IV. 3, V. 1. The length of full-grown specimens is 3 metres, or about 10 feet, that of the skull being 530 millim.

According to Gervais, skulls in the Paris Museum, received from such various localities as the Cape of Good Hope, the Indian Ocean, China, Japan, and New Zealand, cannot be satisfactorily distinguished from those of the common European form, indicating an almost cosmopolitan distribution. There is, however, one skull in the collection from the Cape of Good Hope, referred to *T. aduncus*, Hemprich & Ehrenberg (from the Red Sea), which differs from the ordinary form in little but its larger size, being 600 mm. ($23\frac{3}{4}$ inches) long. Its teeth are $\frac{24}{24}$, the antero-posterior diameter of their crowns measuring as much as 8 millim. A figure of this skull is given upon plate xxxiv. of the 'Ostéographie des Cétacés.' Its claim to be considered of a different species rests apparently only upon its large size, but may be provisionally admitted.

The species referred to this section in Dr. Gray's latest list are:— 1. *Tursio truncatus* = *Delphinus tursio*. *Hab.* North Sea and Mediterranean. 2. *T. erebennus*. *Hab.* Philadelphia (!). 3. *T. metis*. *Hab.* West Africa? 4. *T. cymodice*. *Hab.* River Uragua? 5. *T. abusalam*. *Hab.* Cape of Good Hope. 6. *T. eurynome*. *Hab.* South Sea, India?, Bay of Bengal. And 7. *T. catalania*. *Hab.* North-west coast of Australia. The remark is added that "these skulls are all very much alike." The last named species is founded on two specimens in the British Museum.[2] In the Museum of the College of Surgeons there is another, of unknown origin, exactly resembling them; and the similarity of the three, and their difference from all the others, especially in their considerably smaller size (the entire length of the skull being only 440 mm.) and rather more numerous teeth ($\frac{25-26}{22-22}$ in the College specimen), leave me no hesitation about retaining this as a distinct species. In the Paris Museum there is a skull from the China seas, of about the same size and very like these, but that the borders of the premaxillaries are not so much contracted in the proximal part of the beak. The teeth are $\frac{23}{23}$, but as the apex of the upper jaw has been damaged, possibly a few more may have been originally present.

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[1] Fischer gives C. 7, D. 13 or 14, L. 14, C. 30 or 31; total 64 or 65.

[2] These were obtained off the north coast of Australia by Mr. John Mac-

All the other British-Museum skulls certainly resemble each other closely, though with slight differences. *T. cymodice* may be at once expunged from the list. It is founded upon a single skull of a very young animal; the basilar suture is not closed, and all its distinguishing characters are those of immaturity. It is impossible to say even of which variety it is the young.

The others may be divided into two types—those with a broader and more flattened rostrum, and those in which the rostrum is narrower. This is a difference, it will be observed, which may depend upon age, or perhaps on sex, as, according to Fischer's observations quoted above, the rostrum of the female is broader than that of the male. To the first type belong most of the undoubted European specimens assigned to *T. truncatus*; to the latter most of the exotic ones, or those of unknown locality, assigned to *T. metis* and *T. eurynome*. This last is founded on one skull only, which differs from *T. metis* in the teeth being slightly smaller and more numerous (*i.e.* $\frac{25}{23}$). *T. aduncas*, the large species figured by Gervais, is of the narrow form, as is also one assigned to *Tursiops tursio* (*Tursio truncatus* of Gray), "de la Manche," figured in the same plate. There is one Hunterian skull in the College Museum, of unknown locality (No. 2486), of this type. It may be remarked that the two broad skulls of which the sex is known—viz., the one sent to Hunter by Jenner from Berkeley, and the one taken at the mouth of the Thames in 1828, are both females; and a decidedly narrow one lately received into the collection is that of a male which lived some months in the Brighton and Westminster Aquariums,—thus quite confirming Fischer's observations.

We have a tolerably full description of the external characters of a *Tursiops* common in the New-Zealand seas, which has been assigned, without, as far as I can learn, any definite reason, to Gray's *T. metis*[1]; and it is interesting to find that, as far as this

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gillivray, who has given a description of the external characters of the animals, accompanied by measurements. See Proc. Zool. Soc. 1862, p. 143.

[1] "Description of the 'Cow-fish' or 'Bottle-nosed Dolphin' (*Tursio metis*) of the Sounds on the west coast of Otago," by Captain T. W. Hutton. Trans. N.-Z. Inst. vol. viii. (1875), p. 180. For the skeleton, see Hector, "Notes on New-Zealand Cetacea," Trans. N.-Z. Inst. vol. ix. (1876), p. 477.

description enables us to judge, there is absolutely nothing to distinguish it, either in the external proportions, the distribution of the colours, or the osteological characters, from the common *T. tursio* of the European seas. It is true that in the only skeleton described it is stated that but 12 pairs of ribs are present; but as the last pair is so often wanting or lost in preparation, this is of little consequence, especially as the total number of vertebræ is given as 64.

An animal of this genus is also found in the North Pacific off the Californian coast, the "Cow-fish" of Scammon, *Tursio gillii* of Dall[1]; but there is nothing in the description of the external characters, "based upon two momentary observations," the habits, or the one portion of the animal actually obtained, to distinguish it from *T. tursio* of the European seas. Perhaps the skull in the Paris Museum, sent from Monterey, California, in 1879, belongs to this form if distinct. It is 510 mm. in length, and with comparatively few and large teeth, $\frac{20}{20}$ in number, and 7 mm. in antero-posterior diameter at the base. It is very like the skull of Gray's *T. metis*, figured in the 'Zoology of the Erebus and Terror.'

In the International Fisheries Exhibition of the present year, among the beautiful and instructive models of Cetaceans and other aquatic animals shown by the United States Commissioners, are coloured casts in *papier maché* of an animal of this group, and of the heads of two individuals marked male and female, the former being apparently the same individual as the entire animal. These are labelled *Tursio subridens*, True. MS. On comparing them with the figure of *D. tursio* in the Trans. Zool. Soc. vol. xi. pl. 1, from the coast of Wales, the only noticeable difference is in the colour of the lower jaw and chin. In the figure this part is entirely white. In the male American specimen it is black, this colour extending farther back in the middle line below, than on the sides of the jaw, and terminating in a point at about the level of the eye. This might have been thought to constitute a specific difference; but in the cast said to be that of a female of the same species there is only a dark gray patch confined to the anterior part of the under surface of the chin; so that with the totally white-throated English specimen, we have three different and quite distinct conditions of the coloration of this region—one, that of the American female, being exactly intermediate between the other two. Until a larger series of specimens are examined, it would not be safe to establish specific distinctions on such characters, especially when we bear in mind the different descriptions of the colours of animals attributed to this species given by Fischer. A skull attributed to this form, presumably of one of the same individuals, is in the collection: it is that of a not fully adult animal; and on comparing it with a specimen in the same state of development taken off the coast of Kent, near Margate, in 1872, not the slightest difference can be detected, either in size or form or in the characters of the teeth.

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[1] Scammon, 'Marine Mammals of the North-western Coast of North America,' pp. 101 and 288 (1874).

It follows from what has just been said, that of the section (or genus) called *Tursiops* there are two distinct forms as indicated by the skulls:—

1. *T. tursio*, including those that have been named *metis, eurynome, cymodice, aduncus*, and *gillii*, some of which may be specifically distinct, but, if so, are very closely allied, and still require definite elucidation of their characters, the principal differences observed in the skulls depending on the comparative breadth of the rostrum, a character much influenced by sex. *T. aduncus* (*T. abusalam*, Gray) differs from the rest only in its superior size.

2. *T. catalania*, of smaller size than any of the others, and with smaller and more numerous teeth. There is truth in the remark with which Dr. Gray concludes his original description of this species. After comparing it with others of the group, he says:—"It is not easy to point out the distinction of these species in words; but there cannot be a doubt about them when they are compared together"[1].

The Dolphins of other groups which present the nearest resemblance to *Tursiops*, both in external and cranial characters, are those of the section of the genus *Clymenia* to which *C. obscura* belongs.

STENO.

Steno, Gray, Zool. Erebus & Terror, p. 43 (1846).

Glyphidelphis, Gervais, Zool. et Pal. Françaises, p. 301 (1859).

This group contains also some comparatively large forms of Dolphins, but which differ greatly from the last in the form of the skull. There are no lateral grooves on the palate, and the pterygoid bones are of the normal form, meeting in the middle line (see fig. 6). The rostrum is long, narrow, compressed, and very distinct from the cranium. The symphysis of the mandible is longer than in any of the other *Delphinidæ*, exceeding one fourth of the length of the ramus. Teeth 21 to 25 on each side of each jaw, of comparatively large size (5–6 millim. in diameter at base of crown), and in most, if not all the species, with their surfaces roughened by fine irregular longitudinal grooves (which are in a great measure effaced in old individuals) not seen in other Dolphins, and whence the name *Glyphidelphis* proposed by Gervais for the section.

The type of this group is known by skulls only, which are very common in museums, but, as far as I am aware, no skeleton of the species has ever been preserved, and its external characters are most imperfectly, if at all, known.

The first published intimation of the existence of the specimens upon which the species was ultimately founded is contained in Cuvier's "Rapport sur diverses Cétacés" &c., in the 'Annales du

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[1] P. Z. S. 1862, p. 145.

Muséum d'Histoire Naturelle,' t. xix. (1812), p. 10, where, though no name is given, it is stated that "il semble aussi que c'est l'espèce légèrement indiqué par Shaw (Gen. Zool. vol. ii. pt. 2, p. 514, 1801) sous le nom de *Delphinus rostratus*"[1]. In the 'Ossemens fossiles,' 2nd edit. t. v. p. 278, 1823[2], these indications were more fully developed, and a species, a "phantom" species as it afterwards turned out, was described under the name of *Delphinus frontatus*, based upon a stuffed specimen and certain skulls which Cuvier supposed to belong to one and the same species. At p. 400 of the same work an "*addition importante*" appears, stating that Van Breda had identified the skulls as belonging to a species quite distinct from the stuffed specimen, for which alone in future Cuvier reserved the name of *frontatus*. This specimen afterwards proved to have been previously described by Blainville as *D. geoffrensis* (now *Inia geoffrensis*), and the name *frontatus* therefore disappeared from the list[3]. In the meantime the skulls in the Paris Museum, and another of the same species observed by M. de Blainville in Sowerby's collection in London, had been fully described, even to the "*rugueuse*

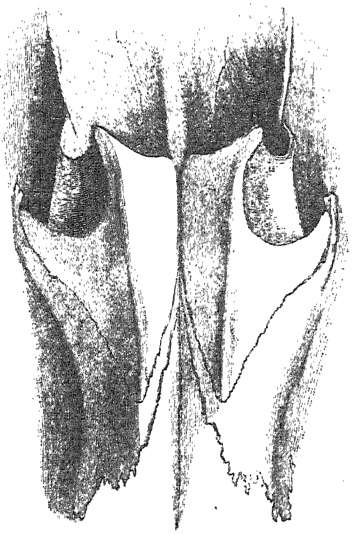

Fig. 6. Palate of *Steno rostratus*.

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[1] In all probability the species now known as *Platanista gangetica* (Lebeck), as subsequently conjectured by Cuvier.

[2] It may be convenient for those to whom the now scarce first edition of this work is inaccessible, to know that it does not contain any account of the Cetacea.

[3] Every one who has followed in Cuvier's steps in endeavouring to identify Dolphins by the old descriptions will echo the sentiment which his researches into the synonymy of this species called forth:—"*toutes ces indications incomplètes ne servent qu'à mettre les naturalistes à la torture.*"

ou plutôt guillochée" surface of the teeth, under the name of *D. rostratus*, Cuvier, by Desmarest in the 'Nouveau Dictionnaire d'Histoire Naturelle,' t. ix. p. 160 (1817), and the 'Mammalogie,' p. 515 (1822); and they appear under the same name in the second edition of Cuvier's 'Règne Animal,' vol. i. p. 289 (1829). In the fourth (posthumous, 8vo) edition of the 'Ossemens Fossiles' (1836) the skulls figure under the name of *rostratus*, the editor, Fréd. Cuvier, saying, "*Nous substitutons au mot* frontatus *du texte du quarto, celui de* rostratus *qui est le nom véritable de cette espèce, comme mon frère l'a reconnu.*" In F. Cuvier's 'Histoire Naturelle des Cétacés,' of the same date, these skulls are associated with Van Breda's figure of the external form, with the remark that "*le nom de* rostratus *est sans doute celui que ce dauphin conservera dans les catalogues méthodiques*" (p. 158). Notwithstanding the very definite character of these statements, and also Desmarest's determination in 1817, the name *frontatus* as applied to this species has lingered on, as will be seen by the synonymy below, probably in consequence of identifications made with the earlier editions of the 'Ossemens Fossiles,' without regard to the later rectification. The objection that might possibly be raised that this species is not the *D. rostratus* of Shaw, as Cuvier at first thought it might be, is unimportant, as no confusion can arise with that animal, which (if recognizable at all) belongs to a totally different genus, and is now universally known by the specific name of *gangeticus* applied to it by Lebeck, and which is simultaneous with, if not prior to, Shaw's name.

The synonymy will therefore stand as follows:—

? *Delphinus rostratus* (Shaw), Cuvier, Ann. du Muséum, xix. p. 10 (1812).

Delphinus rostratus (Cuvier), Desmarest, Nouv. Dict. d'Hist. Nat. ix. p. 160 (1817), and Mammalogie, p. 515 (1822).

Delphinus frontatus (in part), Cuvier, Ossemens Fossiles, 2e édit. v. p. 278 (1823), which name was abandoned in the same work at p. 400.

Delphinus rostratus, Cuvier, Règne Animal, 2e édit. i. p. 289 (1829).

Delphinus planiceps, Van Breda, Verhand. Nederl. Institut. p. 235, figs. 7 & 8 (1829).

Delphinus rostratus, Fréd. Cuvier, Ossemens Fossiles, 4e édit. (1836), and Hist. Nat. des Cétacés, p. 156 (1836).

Steno rostratus and *Steno frontatus*, Gray, Zool. of Erebus and Terror, p. 43 (1846).

Delphinus frontatus, Owen, Cat. Osteol. Spec. Mus. Roy. Coll. Surg. Eng. ii. p. 453 (1853).

Glyphidelphis rostratus, Gervais, Zool. et Paléont. Franç. p. 301 (1859), and Ostéographie des Cétacés, p. 594, tab. xxxvii. figs. 8–11 (1880).

Steno frontatus, Gray, Synopsis of Whales and Dolphins, p. 5 (1868).

It is very remarkable that though the skulls of this large and very well-marked species are common in every museum[1], there is, so far as I am aware, no skeleton or any part of a skeleton which certainly belongs to it preserved anywhere, and very few of the skulls have localities assigned to them. In the Leiden Museum two are said to be from the "Indian Ocean" and one from the "Atlantic;" Indian Ocean, Red Sea, and the Pacific are the localities given by Dr. Gray; while Van Breda's specimen, supposed to belong to this species, and from which alone its external characters are known, came from the coast of Holland. It does not appear to have been met with hitherto in the seas around New Zealand or Australia, or in the North Pacific.

Among the skulls of this form of Dolphin are two well-marked varieties, distinguished by the amount of lateral compression of the rostrum. To the broader form the name of *rostratus* is more properly applied: while those (otherwise quite similar) with a very compressed rostrum have been specifically distinguished by Gray under the name of *Steno compressus* (Erebus and Terror, p. 43, tab. 27, 1846). Specimens of this form from the Indian archipelago were, however, previously described by Schlegel (Abhandl. p. 27, Taf. iii. figs. 2 & 3, 1841) as *Delphinus reinwardtii*, which name will therefore have the priority if it should prove to be a good species.

In the series of ten skulls in the British Museum the two extreme forms look very distinct, but others are quite intermediate; and when the whole series is placed together in order such a regular gradation can be traced, that it becomes impossible to say where the broad form ends and the narrow one begins. Dr. Gray evidently met with this difficulty, as the names attached to the skulls show; some which are marked by him *S. compressus* being indistinguishable from others labelled *S. frontatus*. In the series at Leiden exactly the same occurs, the two forms passing insensibly into each other; and there is one among them that has a shorter and stouter rostrum than any which I have seen elsewhere. The broad form appears to be the most common in collections. Bearing in mind the observations quoted from Fischer upon the sexual characters of the skulls of *D. delphis* and *D. tursio*, the question naturally arises whether the different forms observed in the skulls of this group may not have the same relation to one another. Unfortunately there are no materials available at present for its solution. The teeth are sculptured in both, but are generally rather more numerous in the narrow than in the broad skulls, being usually 23 or 24 in the former and 20 to 23 in the latter on each side of each jaw. The extreme length of these skulls varies between 520 and 550 mm.

A very important contribution to the history of this group of Dolphins has been made by the publication of a good description and figures of both external and anatomical characters of a specimen captured in the South Atlantic in September 1874, in 32° 29′ South lat. and 2° 1′ West longitude, by the officers of the German ship

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[1] There are 10 in the British Museum, the same number at Leiden, 6 at Paris, and 5 in the Museum of the College of Surgeons.

'Gazelle.' It was named by the late Dr. Peters *Delphinus* (*Steno*) *perspicillatus* (Monatsb. Berl. Acad. Wissensch. 1876, p. 360). In the external form there is nothing to distinguish it from one of the ordinary Dolphins, such as *D. delphis*, except that the dorsal fin is rather more obtuse and less falcate. The skull, as figured and described by Peters, closely resembles in form and size the broadest specimens of *S. rostratus*; and it is interesting to note, in connection with Fischer's observations on the commoner species, that the specimen was a female. The teeth are $\frac{24-23}{23-22}$, with a diameter at the base of their crowns of 6 mm., and three occupy a space of 28 mm. Dr. Peters does not say whether their surface is sculptured. The vertebral formula is C. 7, D. 12, L. 15, C. 32, making a total of 66. The manus resembles that of *Lagenorhynchus*, the metacarpals and phalanges being very broad, flattened, and with parallel borders. The number of ossified elements of each digit (excluding the metacarpals) appears to be I. 2, II. 8, III. 6, IV. 2, V. 1. I regret that I have not yet had an opportunity of comparing the skull directly with typical specimens of *S. rostratus* and especially with the very broad one previously mentioned in the Leiden Museum, and also of ascertaining the condition of the surface of the teeth; but I strongly suspect that this individual, so fortunately preserved for scientific examination, will afford us the much-required evidence of the general characters of the animal which furnishes the skulls so common in museums, as if it is not specifically identical with, it is certainly very closely allied to *Steno rostratus*.

SOTALIA.

Sotalia, Gray, Cat. Seals and Whales Brit. Mus. 2nd edit. pp. 393 & 401 (1866).

On account of the general resemblance in the form of the skull, I provisionally associated with the section or genus called *Steno* by Gray the Chinese White Dolphin (*Delphinus sinensis*). The existence of this species was first indicated by Osbeck, who saw it in the Canton River in 1751. Nothing more was heard of it until 1867, when it was rediscovered by the late Mr. R. Swinhoe, who sent a perfect skeleton, prepared from an animal taken in the harbour at Amoy, to the Museum of the College of Surgeons, which has been fully described and figured in the 'Transactions' of the Society, vol. vii. pt. 2, Jan. 1870. The animal must have been about 8 feet in length. The skull, though resembling that of *Steno rostratus* in many points, including the length of the symphysis, is readily distinguished by the different form of the pterygoid bones (see fig. 7), which are narrow and have the inner borders of their inferior surfaces very little developed, leaving a wide space between them. The teeth also are more numerous $\left(\frac{33-32}{32-31}\right)$ and of smaller size. They are considerably worn and truncated, so that it is difficult to ascertain the natural condition of the enamelled surface, but there is no distinct evidence of its having been striated. The vertebral formula is C. 7,

D. 12, L. 10, C. 22, making a total of 51 vertebræ, very different therefore from the skeleton of *D.* (*Steno*) *perspicillatus* described by Dr. Peters. As remarked in the original description, "the principal differences between this skeleton and that of all other known Dolphins lie in the vertebral column. The total number of vertebræ is less, the individual vertebræ are proportionally longer, and their transverse processes are shorter and broader than in any other species. Next

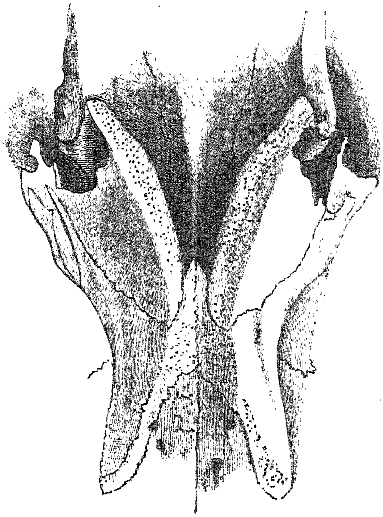

Fig. 7. Palate of *Sotalia sinensis.*

to it in these characters stands *D. guianensis*[1] (genus *Sotalia,* Gray), which has the following vertebral formula—C. 7, D. 12, L. 14, C. 22=55." Among other differential characters it was also pointed out that "the manus is broader at the base than in most Dolphins (e. g. *D. delphis* and *D. tursio*) and much resembles in form that of *D. guianensis* as figured by Prof. Van Beneden. This breadth is caused by the considerable development and position of the two outer digits. The number of ossified elements of each digit (excluding the metacarpals) are—I. 0, II. 6, III. 5, IV. 2, V. 1. Though the manus thus differs in some characters from that of the Common Dolphin, the metacarpal and phalangeal bones are of the usual character, *i. e.* contracted in the middle of their outer borders, or hour-glass shaped, thus differing greatly from the form observed in the true *Steno* (if *D. perspicillatus* is to be taken as typical of that group), where the lateral margins are nearly parallel, and the borders of the first three digits are in contact for nearly the whole of their length.

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[1] Mém. de l'Acad. Roy. de Belgique, Coll. in 8vo, t. xvi. 1863, p. 33.

In the conclusion of the description of this skeleton I said:—"If the osteological characters possessed by this specimen be found to exist in other Dolphins with narrow compressed beaks and long mandibular symphyses, *Steno* will be established as a natural group of generic value." The result has been quite otherwise; for the skeleton described by Dr. Peters and that of the Chinese White Dolphin clearly belong to two different types. For the first the term *Steno* should be reserved. With what other known forms can *D. sinensis* be associated? Since the publication of the description of its skeleton more information has been obtained regarding the animals of the group, properly distinguished by Gray as a special form, to which he gave the name of *Sotalia*, and the indications of the similarity of *D. sinensis* to *D. guianensis*, the type of the group, already pointed out, can be more completely developed[1]. Edward Van Beneden has given a very full description of the external and osteological characters of a specimen taken in the Bay of Rio, where it appears to be of very common occurrence. Unfortunately the individual upon which his description is based was an exceedingly young one; and the imperfect development of the bones not only accounts for some of the peculiarities he noticed, but also renders a comparison with other specimens less satisfactory than it otherwise would be. Gervais has given figures and some details of the osteological characters of another species from the Amazon, *D. pallidus*; and the British Museum possesses two skulls, also of very young individuals, obtained by Mr. Bates near Santarem, on the Upper Amazon, described by Dr. Gray under the name of *Steno tucuxi*. That these are all very closely allied forms there can be no question; but the materials are not yet sufficient to work out their specific characters or geographical distribution. At present they have been found on the coast of Guiana, in the Bay of Rio, and in the upper waters of the Amazon. From the published descriptions it is very difficult to find any characters by which the *Delphinus pallidus* of Gervais, *Steno tucuxi* of Gray, and *Sotalia brasiliensis* of E. Van Beneden can be distinguished specifically.

To this group I have now no hesitation in adding *Delphinus sinensis*. It is curious that it agrees with the American form of which we have the fullest description (*S. brasiliensis*) in its pale coloration, and in its habit of frequenting estuaries and bays, and not the open sea.

A cranium in the Museum of the College of Surgeons, found upon the sea-beach at Aripo, in the north of Ceylon, by Mr. E. W. H. Holdsworth, closely resembles that of *D. sinensis*, but is of smaller size.

Another animal apparently of the same group is *Delphinus*

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[1] See "Mémoire sur un Dauphin nouveau de la Baie de Rio de Janeiro, *Sotalia brasiliensis*," by Ed. Van Beneden: Mém. de l'Acad. Roy. de Belgique, t. xli. 1874; and Gervais, in 'Ostéographie des Cétacés,' p. 594.

(*Steno?*) *gadamu* of Owen[1], described from a mutilated skull and a native drawing of a specimen taken at Vizagapatam (Madras) in 1853. The skull is now in the British Museum: it is that of a young animal. The pterygoids are widely divergent. The rostrum is wider and more depressed than in *D. sinensis*; the premaxillæ especially are of a peculiar form, being narrow at their upper third and enlarging at the middle of the rostrum, where they are both more elevated and wider than in other species. The teeth are $\frac{23-23}{27-28}$ according to Owen. A more complete skull of the same species, from Australia, has been recently added to the Cambridge University Museum.

D. lentiginosus, Owen, from the same locality, described in the same memoir, is a closely allied species, if distinct.

Delphinus plumbeus, Dussumier, in Cuvier's 'Règne Animal,' 2^e edit. t. 1, p. 283 (1829), according to the skull in the Paris Museum, figured by Gervais (Ostéographie, pl. xxxvii.), represents the longest and narrowest form of this type, with the most numerous teeth, viz. $\frac{38}{54}$, only 4 mm. in diameter. The pterygoids are very characteristic. It is a large species, the skull measuring 550 mm. in length. This has been conjecturally identified with *D. malayanus*, Lesson (Voy. de la Coquille, Zool. p. 184, pl. ix. fig. 5 (1826), from external form only).

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Lagenorhynchus, Gray, Zool. Erebus & Terror, p. 34 (1846).

The following characters appear to be common to all the animals of this section of which the complete osteology is known:—

Cranium without grooves on palate. Rostrum scarcely exceeding the length of the cranium, broad at the base, and gradually tapering towards the apex, depressed. The pterygoid bones rather short and broad, united in the middle line (see fig. 8, p. 490). Symphysis of mandible short. Teeth small, not exceeding 4 mm. in diameter, not numerous, 23–33. Vertebræ very numerous, 80 to 90. Spinous and transverse processes of the lumbar vertebræ very long and slender. Manus with broad, flattened metacarpals and phalanges, with parallel borders.

The skulls of the species assigned to this group vary considerably in form. *L. albirostris* especially deviates from the others in the outline, as seen from above, being more regularly pear-shaped, an appearance caused mainly by the anteorbital prominences of the maxilla, frontal and jugal, which stand out on each side behind the notch, being softened off and the rostrum tapering gradually to a sharp apex; while in *L. electra* (also a large species) the prominences are more strongly developed, and the rostrum is more obtuse at the apex. The smaller *L. acutus* and *L. clanculus* are somewhat intermediate, the former, however, inclining strongly to the *electra* type, the latter to that of *albirostris*.

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[1] Trans. Zool. Soc. vol. vi. p. 17.

albirostris in a genus by itself, for which he reserves the name *Lagenorhynchus*, and forms two other genera, *Electra* and *Leucopleurus*, for the others; but it is highly probable that the type and only species of the last, *Leucopleurus arcticus*, Gray, is identical with *Electra acuta*, Gray, of the same list. The only distinguishing characters given for these two genera are—*Electra*, "tooth-line stopping considerably short of the notch;" *Leucopleurus*, "tooth-line reaching nearly to the notch."

Of the skulls of this group in the British Museum, *Lagenorhynchus* (or *Electra*) *asia*, Gray, except for its somewhat inferior size, appears to be the same as *L. electra* (*Electra obtusa* of the Synopsis). *L. fusiformis*, Owen (Trans. Zool. Soc. vol. vi. p. 22), from the Madras seas, appears to be the same or a closely allied species. *Electra thicolea*, founded on a single skull stated to have been brought from the west coast of North America, has a longer and narrower rostrum than any of the others, and forms a transition to the section *Clymenia*, if it is not identical with species which Gray places in that group. *L. clanculus* (Gray, P. Z. S. 1849, p. 2) appears to be a distinct form. The type specimen is from Dr. Dickie's collection from the Pacific Ocean, and is figured among the supplementary plates of the Cetacea of the 'Erebus' and 'Terror' voyage. There is a similar skull in the Museum of the College of Surgeons from the Pacific coast of North America. It has been suggested that *D. cruciger*, Quoy and Gaimard (Voy. de l'Uranie, 1824), and *D. bivittatus*, Lesson and Garnot (Voy. de la Coquille, 1826), may be the same as Gray's *L. clanculus*; but as they are only known by descriptions and drawings made of animals swimming at sea, the identifications are very doubtful. There is also the possibility that *Delphinus fitzroyi* of Waterhouse (Zool. Voy. 'Beagle,' p. 25, 1840), from the coast of Patagonia, may be

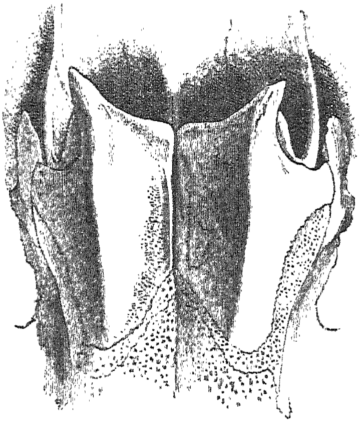

Fig. 8. Palate of *Lagenorhynchus acutus*.

identical, or at all events an allied species, its external characters being evidently those of a *Lagenorhynchus*; but without any knowledge of the form of the cranium, this is a point which cannot be determined. The New-Zealand species described by Hector under the name of *Electra clancula*, is, as stated above, a *Cephalorhynchus*, as is also the *Electra hectori* of Van Beneden, and they have therefore nothing to do with the present group.

Two species of this genus are so frequent in the North Atlantic, especially off the British and Scandinavian coasts, that the number of skeletons in museums is sufficient to determine their osteological characters quite satisfactorily, although there are considerable discrepancies in the accounts of the external appearance and coloration of the specimens which have fallen under the notice of naturalists.

L. albirostris (Gray, Ann. & Mag. N. H. 1846) has fortunately had only one specific name bestowed upon it. Variations in the form and colour, depending partly on age, are shown in the descriptions and figures of two British specimens, both young, by D. J. Cunningham and J. W. Clark, in P. Z. S. 1876. In the first, captured off Great Grimsby, the vertebral formula is C. 7, D. 15, L. & C. 68, total 90. In Clark's specimen, from Lowestoft, there are C. 7, D. 14, L. 24, C. 46 = 91, the last being composed only of cartilage. The two first cervical vertebræ appear always to be united, the rest being free. In a skeleton in the Museum of the College of Surgeons from Norway the vertebræ are C. 7, D. 14, L. & C. 67, making a total of 88; possibly one or two small terminal caudal vertebræ may be missing.

Of the second British species the synonymy is involved in some difficulty. Schlegel, in his 'Abhandlungen aus dem Gebiete der Zoologie und vergleichenden Anatomie,' Heft 1, Leiden, 1841, p. 23, described from the skeleton alone, received from the Faröe Islands, a species of Dolphin which he considered new to science, under the name of *Delphinus eschrichtii*. He says that of the external form nothing is known; but the description of the skeleton, with a figure of the skull, and the fact that the skeleton is still to be seen in the Leiden Museum, are sufficient to identify the species intended. At the conclusion of his description he adds:—"Vielleicht gehört der von Gray, Spic. Zool. i. p. 2, mit ein Paar Worten, unter dem Namen *D. acutus*, beschriebene Delphinschädel hierher, welche Annahme besonders durch die gegebenen Masse Wahrscheinlichkeit erhält. Mit Gewissheit aber lässt sich ohne eine genaue Beschreibung und Abbildung dieses Schädels nichts bestimmen."

In 1843, Rasch described and figured (in a small folio pamphlet published at Christiania) the external and principal osteological characters of a Dolphin, of which a herd of twenty-three were taken in the Bay of Christiania in June of the previous year, under the name of *Delphinus leucopleurus*. There is no doubt but that these were identical with the Leiden skeleton named two years before by Schlegel *D. eschrichtii*: therefore *leucopleurus*, otherwise a very appropriate name, is not admissible. The question remains between Gray's *acutus* and Schlegel's *eschrichtii*. The description and figure in the 'Spicilegia' of the skull contained in Brookes's

Museum, upon which Dr. Gray founded the species, are extremely meagre. I have therefore taken considerable pains to endeavour to ascertain whether the specimen itself can still be appealed to. In the 'Zoology of the Erebus and Terror,' p. 36 (1846), Dr. Gray, under the head of *Lagenorhynchus acutus* (*D. eschrichtii*, Schlegel, being given as a synonym), says:—"This species was first described by me from a skull in Brookes's Museum, which is now at Leyden, and Mr. Schlegel has described it from a skeleton sent from the Faröe Islands." The statement that the original skull is "now at Leyden" is repeated in the 'Catalogue of Seals and Whales' in the British Museum, 1866. Judging from the extract quoted above, Schlegel apparently was not aware of the specimen being in the Leiden Museum in 1841, which is rather remarkable, as he was at that time, although not actually in charge of the collection, a member of the staff; but this is no proof that it was not there.

With the obliging assistance of Dr. Jentink, in August last I carefully examined all the Dolphins' skulls in the collection, with a view to ascertain whether Gray's type skull is there or not. A difficulty at once arose from the fact that none of the skulls have any number or mark upon them by which their history could be traced with certainty. They are all placed upon wooden stands, to which they are fixed in such a way that they can be readily taken off for examination and replaced; the names and indications of origin are written on cards fixed on the stands, and there is unfortunately no guarantee that the latter may not have been changed, as in some cases it is quite evident has been done.

Looking through the skulls, I found one which had been recently labelled "*D. tursio*," which evidently belonged to the species in question. There was no history on the card or any indication of its origin on the skull itself. The idea at once occurred that this might be the sought-for specimen. Comparing it with the figure and the description in the 'Spicilegia,' the agreement was quite as close as could be expected. The teeth, as near as they could be counted, were of the right number, the length of the beak (8 inches) and its breadth at base ($4\frac{1}{2}$) were exact; the only difference was in the length of the cranial portion of the skull, which Dr. Gray gives as 7 inches, and which I made as 8; but this is a difficult measurement to take exactly, especially if taken rapidly, as we know was Dr. Gray's habit. The absence of all indication upon the skull itself of its history in no way militates against its coming from Brookes's Museum; on the contrary, rather corroborates it, as the other skull in the collection, that of *D. longirostris*, also described by Gray in the 'Spicilegia,' and which Schlegel himself mentions in his 'Abhandlungen' (p. 19) as having been received from the collection of Dr. Brookes, is equally without indication of its *provenance*, and is otherwise in much the same general condition. We have thus evidence from published writings of two Dolphins' skulls passing from the Brookesian to the Leiden Museum—the type of *D. acutus*, as stated by Gray, and the type of *D. longirostris*, as stated by Schlegel. Of the identification of the latter there is no doubt; its characters are quite unlike those of any other in the collection, and it is still upon the stand which bears the inscription "Brookes's Museum." This collection was sold in 1828; and the next question was to endeavour to find a record of the specimens from it which were purchased for the Leiden Museum. After a considerable search it was ascertained by Dr. Jentink, and communicated to me by letter after I had left Leiden, that two Dolphins' skulls are mentioned in the original list as derived from this source, which are described as "*Delphinus globiceps* and *Phocæna longirostris*," from which Dr. Jentink concluded that the type of *D. acutus* was never in the collection; a conclusion, however, with which I was not satisfied. The previous indications of two Dolphins' skulls passing from Brookes's collection to Leiden were confirmed, and there was considerable probability in such a list of an error of nomenclature, especially at a time when the knowledge of the distinguishing characters of the crania of Cetacea was so slight and confined to so few individuals.

The next step was therefore to ascertain what had become of the skull called *D. globiceps*, the other one being satisfactorily accounted for; so I wrote to Dr. Jentink on this point, and received the following answer, dated Leiden, 14th Aug. 1883:—"Of *Delphinus globiceps* we only possess a single skull labelled 'Côte de Holland,' four skeletons from 'Zéelande' and 'Japon,' one stuffed from 'Zéelande,' and two fœtuses from 'Iles Faer;' and I believe that *globiceps* can hardly be confounded with any other species. Moreover we have no other skull which shows signs that it formerly belonged to Brookes's collection, only *Delphinus longirostris* as you know. The skull of *D. globiceps* bought from Brookes thus must have been lost. It is not in our collection. But where can the type of Gray's *acutus* be hidden?"

Putting all the circumstances together, my inference is that the type of Gray's *acutus* is the skull incorrectly described in the sale list as *D. globiceps* (the inaccuracy of that list in such matters is shown by the name *Phocæna longirostris* for a specimen previously and properly described by Gray as *Delphinus longirostris*), which, never having been given its proper name, was lost sight of even by Schlegel. If it first bore the name of *D. globiceps*, as it more recently did that of *D. tursio*, both of which it is perfectly unlike, it is scarcely surprising that its identity has disappeared. It is very unfortunate that this should be so, as a doubt may always be raised upon the subject; but the evidence to my mind is almost irresistible that the type of Gray's *D. acutus* still exists in the skull of unrecorded origin in the Leiden Museum, and also that this skull is specifically identical with the animals afterwards described as *D. eschrichtii* by Schlegel and *D. leucopleurus* by Rasch.

In this species the teeth are usually 34 to 35 on each side of each jaw. The total number of vertebræ varies in different individuals between 79 and 82, either 80 or 81 being the most common. The number of ribs appears to be always 15 pairs. There is often a difficulty in determining between the lumbar and the caudal region, owing to the irregular development of the anterior chevron bones. The cervical vertebræ have a greater tendency to ankylosis than in other Dolphins, the first three being often united by their bodies, and several of the others by their neural arches. This disposition has not been observed in *L. albirostris*. The manus also has a more characteristically flattened and broad form than in *L. albirostris*.

Of the other species of Dolphins which have been assigned to this group, the following are the most noteworthy:—

Lagenorhynchus perspicillatus, Cope (Proc. Acad. Nat. Sciences, Philadelphia, 1876, p. 136), said to be abundant on the coast of Maine (North Atlantic). This is apparently closely allied to, if not identical with, *L. acutus*, as might naturally be supposed from its habitat. Slight differences in the external colouring are pointed out, and the teeth are said to be only $\frac{30}{30}$. A figure of the animal is given. A more rigid examination both of the osteological and the external characters of a series of specimens is required before its specific distinction from *L. acutus* can be admitted.

Lagenorhynchus obliquidens, Gill, from its remote habitat (the North Pacific) might be expected to present greater differences; but if it does these have not yet been pointed out. It appears to be closely allied to *L. acutus*, judging by Scammon's figure and description (Marine Mammals of N. America, p. 98). The description of the skeleton by Dall, in the same work, is full of anatomical details, but is without any discrimination as to characters common to many other species, or such as may be peculiar to the individual described, and does not even state the number of the vertebræ or the ribs.

Gervais's account of this genus is very confused. In enumerating the species (p. 593) he speaks of *L. eschrichtii* from the North Atlantic, giving as synonyms in the footnote *L. eschrichtii*, Schlegel, *D. leucopleurus*, Rasch, and *D. acutus*, Gray. In describing the skeleton he speaks of *L. eschrichtii* and *L. leucopleurus* as if they were distinct species, pointing out, among other characters, that in *L. eschrichtii* the six anterior ribs have heads, while in *L. leucopleurus* only five are so provided. He speaks of Gray's *L. asia*, but makes no mention of Gray's *L. electra*, which, being placed first in the original description in the 'Zoology of the Erebus and Terror,' should be taken as the type and name-giver, if the two are considered as one, as even Gray appears to consider as probable. He identifies Owen's *D. fusiformis* with Gray's *L. clanculus*. In the plate devoted to the genus (tab. xxxvi.), *L. albirostris* (fig. 5) appears to be the same as Gray's; but the cranium and hinder part of the maxilla are wider, perhaps because it is from a younger individual. *L. leucopleurus* (fig. 4) is probably also taken from a young individual. *L. asia* (fig. 6) is larger even than Gray's *electra*, though the principal difference between the types of these supposed species is that the former is somewhat smaller than the latter. *L. cruciger* (fig. 3) is apparently Gray's *clanculus*; if so the former name should have the preference, provided any satisfactory identification with Quoy and Gaimard's *D. cruciger* can be made. Lastly, *L. breviceps* (fig. 2) is evidently the same as Gray's *Delphinus obscurus* or *Clymenia obscura* (Zool. 'Erebus' and 'Terror,' pl. xvi.).

CLYMENIA.

Clymene, Gray, P. Z. S. 1864, p. 237.
Clymenia, Gray, Synopsis of Whales and Dolphins, p. 6 (1868).
Prodelphinus, Gervais, Ostéographie des Cétacés, p. 604 (1880).

This is not a very homogeneous group, and may perhaps require further division when the characters of some of the animals at present referred to it are better known. The cranium has no lateral grooves on the palate, by which it is distinguished from *Delphinus* proper, to which otherwise some of the species present a close resemblance. The pterygoid bones are well developed and touch for the whole length of their inner sides, as in *Delphinus* and *Tursio*. The rostrum is long and narrow, or of moderate width, always more than half the entire length of the skull. The symphysis of the lower jaw is less than one fifth of the length of the ramus, but varies according to the width of the rostrum. When the rostrum is wide the symphysis is short; when narrow the two rami of the mandible come in contact for a larger space. The teeth are small, the largest less than 3 millim. in diameter at the base, and numerous, exceeding 30 on each side of each jaw. The vertebræ in all the known skeletons (which are very few) from 73 to 76 in number.

This group contains a considerable number of forms, almost all known by the skulls alone, which vary chiefly in the comparative width of the rostrum, passing off almost insensibly into *Lagenorhynchus* on the one side, and *Steno* on the other. In fact, two species which I place in this group, on account of their close resemblance to others undoubtedly members of it, Gray includes respectively in the two genera just named.

The skulls at present referred to this genus can be separated into at least four distinct types, distinguished chiefly by the comparative breadth of the rostrum.

A. The broadest form is represented by skulls which in the British Museum are called *Clymenia obscura*, being referred to the stuffed specimen described as *Delphinus* (*Grampus*) *obscurus* in Gray's 'Spicilegia,' p. 2 (1828), which Schlegel identifies with *D. superciliosus* of Garnot and Lesson ('Voyage de la Coquille,' 1826), of which, however, so little is really known that the identification cannot be verified.

The type specimen, from the Cape of Good Hope, described and figured in the 'Spicilegia,' is now in the British Museum, and presents much resemblance in its external characters to one of the *Tursiops* group, having a high falcate dorsal fin and long falcate pectorals. There seems no reason why the skulls which Gray subsequently referred to this species may not belong to it, as the teeth and palate, as far as they can be seen, appear to correspond; but unless the whole cranium could be removed from the skin so as to allow of a complete comparison, absolute certainty on this point cannot be attained. But as the species seems to be a common one both at the Cape of Good Hope and New Zealand, the question will probably soon be settled by the examination of recent specimens.

A skull is also figured in Gervais's 'Ostéographie' under the name of *Lagenorhynchus breviceps* (pl. xxxvi. fig. 2). There is a skeleton at Leiden from the Cape, described by Schlegel in his 'Abhandlungen' (p. 22). The figure of the upper surface of the skull (tab. 1. fig. 3) is not quite correct, the rostrum not being sufficiently rounded at the sides. The vertebræ are C. 7, D. 13 (15?), L. 20 (18?), C. 33, total 73. The teeth about $\frac{30}{30}$. In the British Museum are four skulls, two from the Cape and two without locality. In the College of Surgeons Museum two, both from New Zealand; and there is one skull in the Cambridge University Museum. Hector figures a skull from New Zealand (Trans. N.-Z. Inst. vol. v. pl. i.). The teeth in all these specimens are from 30 to 33 in number. Those in the Cambridge specimen are slightly larger than in the others, being almost 3 millim. in diameter. In all the "triangle in front of the blowers," formed by the premaxillæ, is flat and elevated on each side above the maxillæ, which slope down laterally to the supraorbital ridge. The most opposite form to this among the Dolphins is *Steno*, where the "triangle" is concave, the middle part being sunk between the lateral ridges, and though the latter are raised above the supraorbital plates of the maxillæ, these, instead of falling away laterally, rise up, forming an elevated supraorbital ridge. Most of the other Dolphins are intermediate in this respect. In the rostrum the premaxillæ are thick and well raised above the maxillæ, as in *Tursiops tursio*, to which the cranium bears considerable resemblance, though of much smaller size.

Clymenia similis, Gray, from the Cape of Good Hope, is probably of the same species; the only difference being a constriction of the posterior part of the palate in the region of the palatine bones, as figured by Gray (P. Z. S. 1868, p. 147); but this is a character which varies in different specimens of *C. obscura*.

A single skull in the British Museum (from the Pacific Ocean) described and catalogued as *Lagenorhynchus thicolea*[1], and subsequently as *Electra thicolea*, and figured under the former name in the supplementary plates to the 'Zoology of the Erebus and Terror' (pl. 36), is very like that of *Clymenia obscura*; but without knowledge of the rest of the skeleton, it is impossible to say whether it really belongs to this group or to the one to which Dr. Gray assigned it. It is of the same size as *C. obscura*, but the rostrum is more depressed, the premaxillæ less prominent, and the nares and the premaxillæ in front of the nares are narrower. The lower jaw is somewhat stouter, the ramus deeper from above downwards, and the symphysis more vertical. The most valid distinction, however, seems to be in the teeth, which are more numerous and rather more slender and close together. Unfortunately they are very incomplete in this much mutilated and unique specimen, but they appear to have exceeded 40 in number on each side of each jaw; whereas in *C. obscura* they do not appear to be ever more numerous than 33.

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[1] P. Z. S. 1849, p. 2.

Perhaps *Delphinus leucorhamphus* of Péron, or *Leucorhamphus peronii*, Lilljeborg, belongs to this group. It is a Dolphin from the South Seas, remarkable for the absence of a dorsal fin. It is not represented in the British-Museum collection; but a skull in the Museum of the College of Surgeons, which I believe to belong to this species (as it agrees with one so called in the Paris Museum), is not unlike that of *Clymenia obscura*, having a rostrum broad at the base, and gradually tapering and much depressed. It is of larger size, and the teeth are very small and numerous. Without a knowledge of its skeleton, it is difficult to assign its exact position, or decide whether the absence of dorsal fin entitles it to generic distinction.

B. Another distinct form of *Clymenia* is represented by three skulls in the British Museum. Of these two are marked "*Delphinus euphrosyne*, 'Erebus' and 'Terror,'" = "*Clymenia euphrosynoides*, Supp. Cat. Seals and Whales, p. 71;" the other, "*Clymenia dorides*, Supp. Cat. Seals and Whales, p. 71." "*Styx*" is also written upon the label of the latter.

Upon these specimens, one in the Norwich Museum, and another in the United-Service Museum, the following four species in Gray's 'Synopsis' and 'Supplement' are founded:—

Clymenia (*Micropia*) *euphrosyne.*
Clymenia (*Micropia*) *styx.*
Clymenia (*Clymenia*) *euphrosynoides.*
Clymenia (*Clymenia*) *dorides.*

In all these the teeth vary from 40 to 46 on each side of each jaw. The anterior nares are very small, with a large flat space in front. I am not able to detect any difference of specific importance between them, and am inclined also to include with them *Delphinus marginatus*, Duvernoy (in Pucheran, Revue et Mag. de Zoologie, 1854, p. 547), described from two individuals taken at Dieppe, and of which the external and osteological characters are well known, one of the skeletons being mounted in the Paris Museum. It is described by Fischer[1], and parts of it figured in Gervais's 'Ostéographie.' The skeleton is very like that of *D. delphis*. The vertebral formula is C. 7, D. 15, L. 22, C. 32, total 76. It belongs to a quite adult animal. The skull is 460 millim. in length, and has $\frac{47}{44}$ teeth, the antero-posterior diameter of the largest of which is 3 millim. The animal was 2·090 metres in length.

After describing the skeleton, Fischer remarks, "Le *Delphinus euphrosyne*, Gray, de la mer du Nord, est peut-être identique avec le *C. marginata*."

The single skull from the Mediterranean upon which Gervais founded *D. tethyos*, now in the Paris Museum, is so similar that I should be disposed to include it also, at all events until some distinction can be shown, in the same species. It is rather smaller than the skull of *D. marginata* from Dieppe, measuring 436 millim. in length.

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[1] "Cétacés du Sud-Ouest de la France" (Actes de la Soc. Linn. de Bordeaux, xxxv. p. 150, 1881).

C. The next form of skull, with still narrower rostrum, is one which is very abundant in all collections. It was first distinguished from *D. delphis* by Cuvier (Annales du Muséum, xix. 1812, p. 9) under the name of *D. dubius*, with the following characters:—“Smaller than *D. delphis*, with narrower rostrum, flat (not grooved) below. Vomer showing itself for a small longitudinal space in the middle, between the intermaxillaries and the maxillaries. Teeth slender and pointed as in *D. delphis*, 35 on each side of each jaw, 140 in all.” In the series of skulls referable generally to this form in the British Museum there are two distinct types, one called *Clymenia doris* and the other *Steno attenuatus*. With the former must be placed the solitary imperfect cranium of *Delphinus clymene* (Cat. Cetacea B. M. 1850, p. 115)=*Clymenia normalis* (Synopsis), which differs from the true *C. doris* in having the teeth rather more numerous (38) and more slender (only 2 millim. in diameter), and in the rostrum being rather more depressed and the premaxilla less elevated above the maxilla. There is a specimen like this in the Museum of the Cambridge University; and one, quite intermediate between it and the typical *C. doris*, in the Museum of the College of Surgeons. With *Steno attenuatus* must be included *Steno capensis*, Gray, not distinguishable from it. This must be a common form, judging by the number of crania met with in collections, but unfortunately entire skeletons are extremely rare. It certainly presents a distinct approach to the typical *Steno* in the length and compression of the rostrum, the length of the symphysis ($\frac{1}{4}$ to $\frac{1}{5}$ of that of the ramus), and also the elevation of the anterior part of the infraorbital ridge, causing a distinct depression between it and the raised outer edge of the premaxillæ. Dr. Gray says, in his ‘Synopsis’ (p. 5), “This section is nearly intermediate between *Steno* and *Clymenia*.” Though a single well-marked specimen of *Clymenia doris* and of *Steno attenuatus* may be so unlike as to justify their being placed as at least distinct species, it is very remarkable that when a large series are compared together, as those of the British Museum and College of Surgeons collections combined, the two extremes pass so insensibly into each other that it is impossible to say where one begins and the other ends; and it is difficult to avoid the suspicion that the differences depend on age or sex, or on individual variation, especially since we know how great the differences depending on these causes are in other better-known species. A comparison of the skeletons of two of the extreme forms would go far to clear up the difficulty. The size and form of the teeth is much alike in all: they may be described as rather stout (being fully 3 millim. in diameter) compared with *C. euphrosyne, obscura*, or *longirostris*; but their numbers vary greatly, even in skulls otherwise quite similar. As a general rule the broader skulls, or those referable to *Clymenia doris*, have the smaller number, *i.e.* from 33 to 38, while the narrower forms (*Steno attenuatus*) have generally as many as 38 or 40 on each side of each jaw. Very few of the specimens of either form have localities assigned to them.

In the Paris Museum are 12 skulls of this form of *Clymenia*, presenting the same diversities of character. They are mostly referred to *D. dubius*, Cuvier, though it is impossible now to say which were the identical specimens upon which he founded the species.

One is a very important specimen, the nearly complete skeleton and also the stuffed skin being preserved with it. It belongs to the *Steno attenuatus* type, and is named *Delphinus brevimanus*, Hombron & Jacquinot, 'Voy. de l'Astrolabe,' Zoologie, 1840, pl. 21. It comes from Malacca. The extreme length of the skull is 405 millim. It is not distinguishable from others marked *D. dubius*. The vertebræ are: C. 7, D. 13, L. & C. 56=76, but possibly one or two are wanting from the end of the tail. The general form of the vertebræ is like that of *D. delphis*. The form and arrangement of the bones of the manus, as figured by Gervais, are exactly like those of *C. marginata* (*euphrosyne*). Another skull of the same form is stated to be from Madagascar. Of the broad form (*Clymenia doris*, Gray), one is called *D. dubius*, from St. Helena. One called *D. frænatus*, F. Cuvier, from Cape Verd, sent by Dussumier, is exactly like the figure of *D. doris* in 'Zool. Erebus and Terror,' plate 20; and another is marked *D. frontalis*, Dussumier, also from Cape Verd. The under surfaces of these two are figured in Gervais's 'Ostéographie,' pl. xxxviii. figs. 4 and 5. The length of different skulls of this group (or species?) in the Paris Museum varies between 383 and 420 millim., and the number of the teeth from 36 to 45 on each side of each jaw.

D. A fourth distinct form of *Clymenia* is characterized by a very narrow cranium, a long, slender rostrum, and numerous fine teeth, about 50 or more in number on each side above and below.

The type of this group is Gray's *D. longirostris* ('Spicilegia,' p. 1, 1828), formerly in the museum of Joshua Brookes, and now at Leiden. It was redescribed and figured by Schlegel in his 'Abhandlungen'; but notwithstanding his clear statement (which I have myself verified by an examination of the specimen) that "die beiden tiefen Rinnen, welche beim gemeinen Delphin auf der Unterseite des Oberkiefes hinlaufen, und sich bis an dessen vorderes Drittel erstrecken, fehlen hier gänzlich," it was retained by Gray in all his successive lists at the head of the restricted genus *Delphinus*, characterized by "*Palate with a deep groove on each side.*" This error has caused much confusion, separating it from its nearest congeners, and inducing Gervais to refer to the same species one of the true Dolphins, which is really not allied to it.

The skull appears to be that of a young animal. Its entire length is 425 millim., of which the rostrum occupies 280; the greatest breadth of the cranium is 153 millim.; the width of the rostrum at the base 72 millim. The teeth are very small and slender, about 50 on each side in each jaw.

The skulls in the British Museum which may be referred to this section are named, according to Gray's 'Synopsis,' p. 6:—

Clymenia (*Micropia*) *stenorhyncha*.
Clymenia (*Euphrosyne*) *microps*.
Clymenia (*Euphrosyne*) *alope*.

In all the premaxillæ are very thick and prominent, and bordered by a strong groove laterally. They vary considerably in comparative width and length of rostrum, *stenorhyncha* being the narrowest, and *alope* the broadest. One of the specimens marked with the latter name has the rostrum considerably wider than the other, approaching very near in proportions to *Clymenia euphrosyne* (Section B). The College of Surgeons Museum has two specimens belonging to this group, one of which is intermediate between Gray's *stenorhyncha* and *microps*.

D. roseiventris (Hombron & Jacquinot, Voy. au Pôle Sud, Zool. t. 1. p. 39), of which there is a skull in the Paris Museum, figured by Gervais ('Ostéographie,' pl. xxxviii. figs. 6 & 6 *a*), is also of the same form, and, except in its smaller size, closely resembles the original *longirostris* of Gray. It is certainly the same as *microps*.

No skeleton of any animal of this group exists in any museum I have visited.

DELPHINUS, Linn.

Eudelphinus, Gervais, 'Ostéographie des Cétacés,' p. 600 (1880).

If the name of *Delphinus* is to be retained as a generic appellation, it is to this section that it properly belongs, as its type is the common Dolphin of the Mediterranean, the "Delphis" of the Greeks; and therefore *Eudelphinus* is a superfluous term.

The skulls are distinguished from those of all other Dolphins by the deep longitudinal grooves which run along both sides of the palatal surfaces of the maxillary bones, separating the alveolar border from a strongly pronounced median ridge. The inner borders of the pterygoid bones meet for their whole length (see fig. 9). The rostrum is long and narrow, greatly exceeding the length of the cranial portion (generally about double), and its width at the base is usually about one third of its length. The teeth are small (not exceeding 3 millim. in diameter) and numerous, from $\frac{40}{40}$ to $\frac{60}{60}$ in each jaw.

Delphinus delphis, of the North Atlantic and Mediterranean, may be taken as the type of this group. In the 'Transactions' of this Society, vol. xi. plate 1, I gave a coloured figure of the external characters of a young female (5 feet 1½ inch long) taken off the coast of Cornwall in March 1879. This year (Sept. 17, 1883) I received from Mr. Matthias Dunn another specimen, still younger (only 4 feet 4 inches in length), from the same locality. It differed from the former in having a shorter beak, relatively to its general size, showing, as might be expected, that this is a character influenced by age. Though the general distribution of the colours on the surface of the body was the same, there was this one marked difference. The upper white line, which courses along the side above the pectoral fin towards the head, instead of dipping below the eye and running towards the angle of the mouth as in the former one (and also in Reinhardt's excellent figure [1]), passed straight to the posterior canthus of the eye, and then divided, one tract passing above and the other below that organ, the former merging into the light band just above the suprarostral groove, the latter reaching the angle of the mouth. Between this white band and the pectoral fin the surface was gray, though somewhat varied, but still much darker than in the specimen figured.

These differences are, however, slight compared with those that have been shown by Lafont and Fischer[2] to occur in different individuals, attributed by the last-named author to *Delphinus delphis*, taken in the Bay of Arcachon, where this species is very abundant. Upon these differences Lafont established five species: *D. fusus*, *D. souverbianus*, *D. variegatus*, *D. balteatus*, and *D. moschatus*, which Fischer reduces to two marked varieties, one having yellow sides, the other with grey sides. The description and figures of the external and osteological characters of so many individuals of the common Dolphin from the same locality, given in this memoir, is a contribution to the progress of Cetology the importance of which can scarcely be overrated; as if these are really all to be regarded as one species, as appears the most reasonable view, especially since the variation of external characters does not appear to go hand in hand with

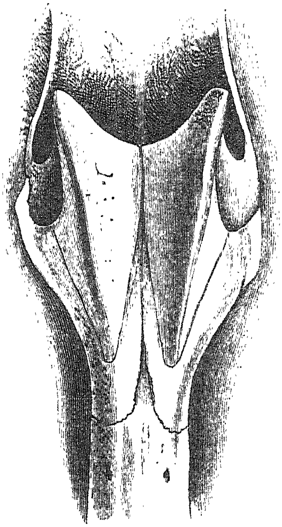

Fig. 9.—Palate of *Delphinus delphis*.

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[1] Naturh. Forenings Vidensk. Meddelelser, 1866, tav. v.

[2] "Cétacés du Sud-Ouest de la France," Actes de la Soc. Linnéenne de Bordeaux, xxxv., 1881.

those in the skeleton and dentition, numbers of nominal species, founded on slight differences of external or cranial characters, which now encumber our lists, must fall to the ground. But valuable as these observations are they admit of much further extension; indeed, as Fischer truly says, "nous ne sommes qu'au début de l'étude des variations chez les Dauphins."

The observations on the osteological and dental characters may be thus summarized:—The average length of the full-grown animal is rather more than 2 metres (6 feet 7 inches), the longest measuring 2·150 metres. The males and females, when adult, do not differ in size. The differences of the skulls of the two sexes has already been indicated (p. 470). The longest skull of which the dimensions are given (a female) has an extreme length of 460 millim.

The number of the teeth varies considerably in each jaw and each side. Sometimes there are more in the upper than in the lower jaw, and sometimes the reverse is the case. The average number for each side of each jaw of ten individuals was 47, the highest number observed being 53 and the lowest 39.

The number of vertebræ ranges between 73 and 75, 74 being the most usual. The two first cervical vertebræ are united, the remainder free. The ribs are either 14 or 15 pairs, these numbers occurring apparently with about equal frequency. In one case 16 were observed. In two cases the numbers differed on the two sides of the same individual, there being 14 ribs on one side and 15 on the other.

In the manus there was some variability in the number of elements composing each digit; but this may have arisen partly from the difficulty of preserving and counting them. The numbers given are:—I. 2 to 3, II. 8 to 9, III. 5 to 7, IV. 2 to 4, V. 1 to 2.

After the examination of these Arcachon specimens and of others from the British Channel and the Mediterranean, Fischer arrived at this important conclusion:—"Je pense que le Dauphin vulgaire, qui semble habiter presque toutes les mers du globe, présente d'innombrable races ou variétés. Chaque bande de ces Cétacés constitue en quelque sorte une famille, et les individus ayant une même provenance ont des caractères communs qui se perpétuent par la voie d'hérédité. Les caractères distinctifs de ces bandes ou familles sont fournis par la coloration du corps, beaucoup plus variable chez les Dauphins qu'on ne l'admet généralement, par le plus ou moins de largeur du rostre, et par le nombre des dents."

Let us now examine into the evidence of the almost cosmopolitan nature of this form. All considerable osteological collections abound in skulls undistinguishable from the ordinary *Delphinus delphis*; but as very few have any localities assigned to them or any indication of their external or remaining osteological characters, they are of little value for the purpose, except as showing that it is a very abundant and probably wide-spread form. We have, however, a tolerably complete knowledge of a *Delphinus* very frequent in the seas around Australia and New Zealand, *D. novæ-zealandiæ* of Quoy and Gaimard ('Voyage de l'Astrolabe,' p. 49, t. 28), and *D. forsteri*, Gray (Zool. Erebus and Terror, p. 42), first described under the name of *D. delphis* by Forster, a copy of whose original drawing was published by Gray (*op. cit.* tab. 24). *D. fulvo-fasciatus*, Hombron and Jacquinot (Voy. au Pôle Sud, Zool. p. 37, pl. xxi. fig. 1), also appears to have been founded on the same form.

Through the kindness of Mr. W. L. Crowther, of Hobart Town, Tasmania, the Museum of the College of Surgeons has lately received a fine series of skeletons of the common species of Dolphin of the seas around that island, probably that just mentioned, and they are in every character identical with those of *D. delphis* of our coasts; at least, after careful examination and allowing for individual variation, I can find nothing to separate them.

In the United States department of the International Fisheries Exhibition of this year, casts of a Dolphin from the Atlantic coast of America were exhibited, which though not presenting the bright yellowish tint or the variety of coloration of the English specimen figured in the Transactions of the Society, quite come within the range of variation shown by Fischer. I have had also, through the kindness of the Commissioners, an opportunity of carefully comparing the skull sent to the Exhibition, with one of corresponding age and size from our seas, and can detect no difference. This is of course what might be expected; but it is more surprising to find the same form represented in so widely removed a region of the world as the North Pacific; at least this must be our assumption until any specific distinction has been pointed out between *D. bairdii*, Dall, and *D. delphis*. Our knowledge of the former is at present very defective, as in the description of its osteological characters appended to Scammon's work, although a perfect skeleton is said to exist in the Smithsonian Institution, and a 4to page of small type is devoted to a detailed description of the cervical vertebræ, even the number of the other vertebræ is not stated, and no comparison of the skull or other parts is instituted between it and those of *D. delphis*, to which it is so obviously closely allied, but only with other Pacific forms with which it has no special affinity.

It is, however, not at all improbable that there are several modifications of this type of Dolphin, that may be considered of specific value.

In the British Museum Collection is one skull marked *D. major* (Gray, Cat. Seals and Whales B. M. 1866, p. 396), of unknown habitat, considerably larger than any of the others, which otherwise it closely resembles. Its length is 523 mm. (the largest in the collection referred to *D. delphis* being 470 mm.); it has $\frac{46-46}{47-47}$ teeth.

Another form represented by three specimens in the same collection, *D. janira* (Gray, Zool. Erebus & Terror, p. 41, pl. 23), is probably distinct, being of smaller size than *D. delphis*, and with a wider head and shorter rostrum. The number of teeth is about 44. From this *D. pomeegra*, Owen (Trans. Zool. Soc. vol. vi. p. 23), from Madras, appears to me to present no marked distinguishing characters.

A still more distinct form is represented by a skull in the Paris collection, called *D. longirostris*, and figured under that name by

Gervais in the 'Ostéographie des Cétacés,' pl. xxxix. figs. 10 and 11. The specimen is from the Malabar coast, and marked "Dussumier, 1827," but does not appear to have been described until the publication of the 'Ostéographie.' It is certainly not the *D. longirostris* of Gray's 'Spicilegia,' p. 1 (1828), described from a skull now in the Leiden Museum, as that has fewer teeth and no grooves on the palate, and is therefore not a true *Delphinus*, although, as said above, Gray in his Catalogue and Synopsis places it at the head of the section of Dolphins characterized by the "Palate with a deep groove on each side," and joins the Paris specimen with it in his account of the species.

It may be convenient to append a Synopsis of the principal characters of the divisions of the whole family, which appear to me of generic value, with some remarks upon the best-known species. This will serve to show what are the natural groups into which the different members of which it is composed appear, according to our present knowledge, to resolve themselves, although in endeavouring to set it out, the usual difficulty has occurred in arranging in a linear series a number of forms the affinities of which are so closely intertwined. Although the most nearly allied have been brought together when possible, this cannot always be done in such a list. The arrangement must therefore be considered to a certain extent arbitrary, and subject to modification according to the judgment of different zoologists. Even in the primary grouping together of the Dolphins with rounded heads and those with projecting beaks I have probably followed too much the traditional and artificial order, instead of finding one more consonant with natural affinities.

We must wait until our Museums are more abundantly supplied with specimens before it will be possible to attempt with any success a complete and critical examination of the minor modifications which we commonly call specific.

Synopsis of the Genera of DELPHINIDÆ.

A. With rounded head, without distinct rostrum or beak. In the skull the rostrum is about equal in length to the cranial portion.

a. The first and second cervical vertebræ not united.

MONODON, Linnæus, Syst. Nat. ed. 12, i. p. 105 (1766).

Pterygoid bones very small, not meeting in the middle line, approaching each other posteriorly as in *Delphinapterus* (see fig. 3, p. 472). Dentition reduced to a single pair of teeth, which lie horizontally in the maxillæ, and which in the female remain permanently concealed in the alveolus, while in the male the right tooth usually remains similarly concealed and abortive and the left is immensely developed, attaining a length equal to more than half that of the entire animal. Vertebræ: C. 7, D. 11, L. 6, C. 26; total 50[1]. Cervical region comparatively long, and all the vertebræ distinct, or with irregular unions towards the middle of the series. Manus small, short and broad; second and third digits nearly equal, fourth slightly shorter. No dorsal fin.

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[1] The numbers of the vertebræ and of the teeth given in this synopsis are averages, subject to slight individual modifications.

One species, *M. monoceros*, Linn. Arctic seas.

DELPHINAPTERUS, Lacépède, Hist. Nat. des Cétacés, Tabl. des Ordres &c. p. xli (1804)[1].

Beluga, Gray, Spicilegia Zoologica, p. 2 (1828).

Agrees with the last in all the characters above mentioned except the dentition. Teeth $\frac{8}{8}$ to $\frac{10}{10}$, of moderate size, occupying the anterior three-fourths of the rostrum only and corresponding portion of the mandible, separated by intervals considerably wider than their own diameter, and implanted obliquely, the crowns inclining forwards, especially in the upper jaw.

D. leucas (Pallas), the Beluga or White Whale of the Arctic seas, is the only well-established species. It has been divided into several (*rhinodon*, *declivis*, and *angustatus*) by Cope, but these require confirmation. A skull of a young animal in the British Museum, not distinguishable from the northern form, but said to be from the coast of New Holland, was described in 1827 by Dr. Gray, under the name of *D. kingii*. No further light has since been thrown upon this habitat.

b. Atlas and axis firmly united.

PHOCÆNA, Cuvier, Règne Animal, i. p. 279 (1817).

a. Crowns of teeth laterally compressed.

Teeth $\frac{25}{25}$, small, occupying nearly the whole length of the rostrum, with compressed spade-shaped crowns, separated from the root by a constricted neck. Rostrum of skull rather shorter than the cranium proper, broad at the base and tapering towards the apex. Premaxillæ raised into tuberosities in front of the nares. The frontal bones forming a somewhat square elevated protuberance in the middle line of the skull behind the nares, rising altogether above the flattened nasals (see fig. 2, p. 471). Pterygoids very small and widely separated in the middle line. Symphysis of mandible very short. Vertebræ: C. 7, D. 13, L. 14, C. 30; total 64. First to sixth cervical vertebræ, and sometimes the seventh also, coalesced. Manus of moderate size, oval, slightly falcate; second and third digits nearly equal in length, fourth and fifth well developed but shorter. Dorsal fin near the middle of the back, triangular; its height considerably less than the length of the base; its anterior edge frequently furnished with one or more rows of conical horny tubercles.

Phocæna communis, F. Cuvier. *Hab*. European and American coasts of North Atlantic. A closely similar if not identical species

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[1] The Beluga being the first mentioned and type of this genus, in fact the only species of those now recognized by cetologists known to Lacépède, should remain as its representative, although by Gray and others it has been removed to a new genus, and the name *Delphinapterus* transferred to species unknown to its founder.

(*P. vomerina*, Gill) from the North Pacific. Photographs of the skull of one of these animals from Puget Sound, sent to the International Fisheries Exhibition of 1883, when compared with a large series of skulls from the British seas, show absolute identity. There may, however, be characters other than cranial by which they may be distinguished. In the same collection was a photograph of a lower jaw of *Delphinus pectoralis*, Peale, from Hawaii, which has teeth of the same peculiar character as *P. communis*, but which appears to belong to an animal of much larger size, the ramus being 13½ inches long, as against 8½, the length of that of a full-grown common Porpoise. The figure given by Peale (in Wilkes's voyage) of the external form shows an animal with a head like that of the Porpoise, but with a rather high and falcate dorsal fin. The entire length is stated to be 8 feet 8 inches, which would be in correspondence with that of the jaw photographed.

Phocæna spinipennis, Burmeister (P. Z. S. 1865, p. 228, and Ann. Mus. Buenos Ayres, i. p. 380, 1869), from the mouth of the Plata, may be distinct. It forms the genus *Acanthodelphis* of Gray.

NEOMERIS, Gray, Zool. Erebus and Terror, p. 30 (1846).

Closely allied to *Phocæna*, so much so that if the genus had not been generally accepted, it would have been better not to have separated it. The principal difference is the absence of dorsal fin. Teeth $\frac{18}{18}$ to $\frac{20}{20}$, larger proportionally than is *Phocæna*, and more distinctly notched or lobed on the free edge of the crown. Vertebræ: C. 7, D. 13 L. 13, C. 30, total 63 (Leiden Museum).

One species, *N. phocænoides*, Cuvier (R. A. 2nd edit. i. p. 291, 1829), = *Delphinus melas*, Schlegel, Fauna Japonica, from the Indian Ocean and Japan.

β. Crowns of the teeth more or less conical and pointed.

CEPHALORHYNCHUS, Gray, Cat. Cetacea Brit. Mus. p. 106 (1850)[1].

Rostrum as long and sometimes slightly longer than the cranial part of the skull. Pterygoids widely separated from one another (see fig. 4, p. 473). Teeth small (less than 3 mm. in diameter), $\frac{25}{25}$ to $\frac{30}{30}$. Vertebræ: C. 7, D. 13, L. 15, C. 30; total 65. Dorsal fin low, obtusely triangular or rounded. Pectoral fins rather small, narrow, ovate.

To this genus appear to belong the species, real or nominal, described under the following names:—

Delphinus heavisidii, Gray, Spicilegia Zoologica, p. 2 (1828).
D. capensis, F. Cuvier, Hist. Nat. des Mammifères (1829).
D. cephalorhynchus, F. Cuvier, Hist. Nat. des Cétacés, p. 158 (1836).
D. hastatus (Quoy), F. Cuvier, ibid. p. 161.
Electra clancula, Hector, Trans. New Zealand Inst. v. p. 160 (1873).
Electra hectori, Van Beneden, Bull. Acad. Roy. de Belgique, 3rd ser. t. i. no. 6 (1881).

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[1] This generic name is generally attributed to F. Cuvier (Hist. Nat. des Cétacés, 1836, p. 158), but it was only proposed by him as a specific designation.

Delphinus eutropia, Gray, P. Z. S. 1849, p. 1, = *Eutropia dickiei*, Gray, Synopsis, p. 7 (1868).

These are all from the Southern Hemisphere. The last is quite distinct from all the others.

ORCELLA.

Orcaella, Gray, Cat. Seals and Whales Brit. Mus. p. 285 (1866).
Orcella, J. Anderson, P. Z. S. 1871, p. 142.

Pterygoids widely separated from each other. Teeth $\frac{12}{12}$ to $\frac{14}{14}$, small, conical, pointed, rather closely set and occupying nearly the whole length of the rostrum. Vertebræ 62 to 63. Manus of moderate size, not elongated, but somewhat pointed. All the bones of the digits broader than long, except the proximal phalanges of the index and third fingers. Dorsal fin rather small, placed behind the middle of the body.

Two species, both of small size—*O. brevirostris*, from the Bay of Bengal, and *O. fluminalis*, from the Irawaddy river, from 300 to 900 miles from the sea. Our knowledge of these is almost entirely due to Dr. J. Anderson ('Anatomical and Physiological Researches, comprising an Account of the Zoological Results of two Expeditions to Western Yunnan in 1868 and 1875:' 1878).

ORCA, Gray, Zool. Erebus & Terror, p. 33 (1846).

Teeth about $\frac{12}{12}$, occupying nearly the whole length of the rostrum, very large and stout, with conical recurved crowns, and large roots, expanded laterally and flattened or rather hollowed on their anterior and posterior surfaces. Rostrum broad and flattened above, rounded in front; premaxillæ broad and rather concave in front of the nares, contracted at the middle of the rostrum, and expanded again towards the apex. Pterygoids of normal form, but not quite meeting in the middle line. Vertebræ: C. 7, D. 11–12, L. 10, C. 23; total 51 or 52. Bodies of the first and second and sometimes the third cervical vertebræ united, the rest free. Pectoral fin very large, ovate, nearly as broad as long. All the phalanges and metacarpals broader than long. Dorsal fin near the middle of the back, very high and pointed. Anterior part of the head broad and depressed.

All large, powerful, and rapacious animals (15 to 20 feet long); they occur in almost all seas from Greenland to Tasmania. Many species have been described (*O. gladiator*, *duhameli*, *schlegeli*, *latirostris*, *minor*, *eschrichti*, *stenorhyncha*, *capensis*, *magellanica*, *rectipinna*, *atra*, *destructor*, *pacifica*, &c.), but their specific differential characters, if any, have never been clearly defined.

PSEUDORCA, Reinhardt, Oversigt Kong. Danske Vidensk. Selskabs Forhandl. p. 151 (1862).

Teeth about $\frac{10}{10}$. Cranial and dental characters generally like those of *Orca*, except that the roots of the teeth are cylindrical. Vertebræ: C. 7, D. 10, L. 9, C. 24; total 50. First to sixth or seventh cervical vertebræ united. Bodies of the lumbar vertebræ elongated, the length being to the width as 3 to 2. Pectoral fin of moderate size, narrow and pointed. Dorsal fin situated near the middle of the back, of moderate size, falcate. Head in front of the blowhole high, and compressed anteriorly. The snout truncated.

This peculiar form was first known by the discovery of a skull, in a subfossil state, in a fen in Lincolnshire, described by Owen under the name of *Phocæna crassidens* (Brit. Foss. Mamm. & Birds, p. 516, 1846). Animals of apparently the same species were afterwards met with in small herds on the Danish coast, and fully described by Reinhardt. In 1864 (see P. Z. S. 1864, p. 420) two skulls, sent from Tasmania, were described by me under the name of *Orca* (*Pseudorca*?) *meridionalis*[1]. Since that time I have had an opportunity of comparing a larger series of skulls, as well as skeletons, from both localities, and believe that the differential characters upon which the latter species was established depend upon the type being of younger age than the only specimen of the northern form then accessible for comparison. In perfectly adult examples of both I have not been able to detect any constant differences. This fact has an important bearing upon the geographical distribution of the Cetacea, as, if confirmed, it indicates an immense range for a species apparently so rare. The length of the animal is about 14 feet.

GLOBICEPS[2].

Globicephala, Lesson, Nouv. Tableau du Règne Animal, p. 200 (1842).

Globiocephalus, Gray, Zool. Erebus & Terror, p. 32 (1846).

Teeth $\frac{8}{12}$, confined to the anterior half of the rostrum and corresponding part of the mandible, small, conical, curved, sharp-pointed when unworn, sometimes deciduous in old age. Skull broad and depressed. Pterygoid bones of normal form, meeting or very nearly meeting in the middle line (see fig. 1, p. 471). Upper surface of rostrum broad, flat, and concave in front of nares. Premaxillæ as wide, or wider, at the middle of the rostrum as at the base, and very nearly or completely concealing the maxillæ in the anterior half of this region. Vertebræ: C. 7, D. 11, L. 12–14, C. 28–29; total 58 or 59. Bodies of the anterior five or six cervical vertebræ united. Length of the bodies of the lumbar and anterior caudal vertebræ about equal to their width. Pectoral limb very long and narrow, the second digit the longest, and having as many as 12 or 13 phalanges, the third shorter (with 9 phalanges), the first, fourth, and fifth very short. Fore part of the head very round, in consequence of the great development of a cushion of fat in front of the blowhole. Dorsal fin low and triangular, the length of its base considerably exceeding its vertical height.

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[1] It should be noted that the figure of the upper surface of the skull at p. 421 has accidentally not been reversed by the artist, and hence the distortion characteristic of the heads of the *Delphinidæ* is represented the wrong way.

[2] I have ventured to substitute this form of the word, originally proposed by Cuvier in a specific sense, but no longer used as such (*melas* having the priority), for Lesson's more cumbersome, hybrid term. It is certainly an adjective form, but this does not appear to be a bar to its being used generically.

The type of this genus is *G. melas*, Traill, of the North Atlantic. Much confusion exists about the other species, or supposed species. I believe that *G. melas*, like *Pseudorca crassidens*, has an exceedingly wide range, as the common "Blackfish" of the Australian seas (erroneously called *G. macrorhynchus* in most catalogues, as that of Hector, Trans. N.-Z. Inst. vol. v. p. 164) appears not to be distinguishable from it either in external or osteological characters. I have examined a considerable series of skeletons both from the Tasmanian and New-Zealand seas, and, comparing them with specimens from the Faroë Islands, can see no real differences, allowing for the regular change which takes place, especially the increase of the width of the rostrum, with advancing age, and probably also sexual differences not yet understood. Gervais says that the southern skulls have not the rugosities on the upper surface characteristic of old specimens from the north; but in a skull sent to the College of Surgeons by Dr. Hector from New Zealand these are as well marked as in any that I have seen. There is, however, one form readily distinguished by the shape of the bones of the upper surface of the rostrum. The premaxillæ widen out at the middle, so that at this point, and thenceforward to the apex, the maxillaries are completely covered, whereas in *G. melas* a narrow strip of these bones is seen to form the lateral part of the rostrum for its whole length. The skull which presents this form, in the Museum of the Royal College of Surgeons, is the type of Gray's *G. macrorhynchus* (Zool. Erebus and Terror, p. 33, 1846). The teeth are $\frac{7}{8}$, and stouter than in *G. melas*. The specimen was presented by Mr. F. D. Bennett, and is said to be from the South Seas. Skulls of this form exist in many museums, and have been described under different names. One is figured in Van Beneden and Gervais's 'Ostéographie des Cétacés,' pl. 52. fig. 3, as *G. intermedius*, from Guadaloupe; another is Cope's *G. brachypterus* (Proc. Acad. Nat. Sciences Philadelphia, 1876, p. 129); and *G. scammoni* of the same author, from the coast of California, judging from the photographs sent to the International Fisheries Exhibition, is exactly like the type *G. macrorhynchus*. I do not mean to imply that there may not be other specific differences between these last, but with only figures of the skulls to judge by, these certainly cannot be distinguished.

The type of another of Gray's species, *G. affinis*, is also in the Museum of the College. The teeth are $\frac{12}{11}$. It is rather narrower than the others, and the premaxillæ in the rostrum are more convex laterally, approaching the form of *Grampus*, in which genus Gray at one time placed it, and from which it is at once distinguished by the presence of teeth in the upper jaw. It is probably only a variety of *G. melas*.

Delphinus intermedius, described by Harlan (Journ. Acad. Nat. Sc. Philadelphia, vi. p. 51, 1829) only from the external characters, is also, in all probability, *Globiceps melas*.

The genus *Sphærocephalus* of Gray (P. Z. S. 1864, p. 244; Cat. Seals and Whales, 2nd ed. p. 323, 1866), containing one species (*S. incrassatus*, Gray), is founded on a skull of *Globiceps melas*, which has been some time at the bottom of the sea, grinding among the sand and shingle until all the most prominent parts have worn away.

GRAMPUS, Gray, Zool. Erebus and Terror, p. 30 (1846).

Teeth, none in the upper jaw; in the mandible few (3 to 7 on each side) and confined to the region of the symphysis. Vertebræ: C 7, D 12, L 19, C 30; total 68. General external characters much as in *Globiceps*, but the fore part of the head less rounded, and the pectoral fins less elongated.

One species, *G. griseus* (Cuvier), is known, about 13 feet long, and remarkable for the variability of its colour. It occurs in the North Atlantic and Mediterranean. A skull from the Cape of Good Hope, which differs slightly, has been described by Gray as *G. richardsoni*. See also *G. souverbianus*, Fischer, Actes de la Soc. Linn. de Bordeaux, xxxv. p. 210 (1881).

FERESIA, Gray, Suppl. Cat. Seals and Whales in Brit. Mus. p. 78, may be placed here provisionally, although only known at present by the skulls of two individuals, which cannot be placed in any of the other recognized genera. Although its position, if a good genus, cannot be determined until the characters of the remaining parts of the animal are known, the cranium and teeth indicate that it is a connecting link between *Globiceps*, *Grampus*, and *Lagenorhynchus*. From the latter it differs chiefly in the smaller number (about $\frac{12}{12}$) and much larger size (6–7 millim. in diameter at base of crown) of the teeth. The two skulls are both in the British Museum; one is of unknown ~~locality, the other~~ from the "South Seas," obtained ~~through Mr.~~ Godeffroy. They have been both well figured, of half the natural size—the first under the name of *Orca intermedia* in the 'Zoology of the Voyage of the Erebus and Terror,' pl. viii., the second as *Feresia attenuata* in the 'Journal du Muséum Godeffroy,' Heft viii. (1875). Both appear to belong to the same species, although the latter is somewhat smaller and has a narrower rostrum. This is, however, a much younger specimen, and exactly corresponding differences are observed between the young and adults of *Globiceps* and *Orca* of apparently the same species. The smaller size of the teeth of the latter is due partly to younger age and partly to their bases being covered with the dried gum, whereas in the former they are entirely exposed. The greater number of the teeth ($\frac{11-12}{12-13}$, as against $\frac{11-11}{11-10}$) is also owing to the presence of several small ones at the end of the series, which appear to have been lost in the more mature specimen, in reference to which Dr. Gray is quite right in dissenting from an opinion which I once rashly expressed at the commencement of my cetological studies (P. Z. S.

1864, p. 425) that it might be a young individual of one of the larger species of the genus *Orca*.

The principal dimensions of the two skulls, in millimetres, are—

	Total length.	Length of beak.	Width of cranium.	Width of rostrum at base.	Width of rostrum at middle.
1. *F. intermedia* .	356	174	235	120	90
2. *F. attenuata*...	350	172	222	107	80

Lagenorhynchus, Gray, Zool. Erebus & Terror, p. 34 (1846).

Rostrum scarcely exceeding the length of the cranium, broad at the base and gradually tapering towards the apex, depressed. Pterygoid bones normal, meeting in the middle line. Teeth small, not exceeding 4 millim. in diameter, $\frac{23}{23}$ to $\frac{33}{33}$. Vertebræ very numerous, 80 to 90. Spinous and transverse processes of the lumbar vertebræ very long and slender; bodies short. Externally, head with a short but not very distinct beak.

L. albirostris, Gray.

L. acutus, Gray = *L. eschrichtii*, Schlegel, and *L. leucopleurus*, Rasch. Closely allied, if not identical, are *L. perspicillatus*, Cope, and *L. obliquidens*, Gill.

L. electra, Gray. Known from skull only. *L. asia*, Gray.

L. clanculus, Gray. Known from skull only. Not *Electra clancula* of Hector.

Here probably may be placed—*D. cruciger* and *D. albigena*, Quoy and Gaimard; *D. bivittatus*, Lesson and Garnot, and *D. fitzroyi*, Waterhouse.

B. Dolphins with distinctly elongated rostrum, or beak, generally marked off from the antenarial adipose elevation by a V-shaped groove. In the skull the rostrum considerably exceeds the cranial portion in length. Atlas and axis firmly united; all the other cervical vertebræ free.

a. Pterygoid bones of normal form, meeting in the middle line by the whole of their parallel inner edges. Pectoral fins lanceolate. Second and third digits well developed; the rest rudimentary.

α. Palate with deep lateral grooves.

Delphinus, Linnæus, Syst. Nat. ed. 12, i. p. 108 (1766), restricted.

The character of the palate separates the true Dolphins from all other members of the family. The rostrum is long and narrow, generally about double the length of the cranial portion of the skull.

The teeth are small, not exceeding 3 millim. in diameter, and numerous, $\frac{40}{40}$ to $\frac{60}{60}$. Vertebræ 73 to 75.

D. delphis, Linn., with the closely allied or identical *D. novæ zelandiæ*, Quoy and Gaimard, *D. forsteri*, Gray, *D. fulvofasciatus*, Hombron and Jacquinot, and *D. bairdii*, Dall.
D. major, Gray.
D. janira, Gray. *D. pomeegra*, Owen.
D. longirostris, Gervais (not Gray).

β. Palate not grooved.

TURSIOPS, Gervais, Hist. Nat. des Mammifères, ii. p. 323 (1855).

Rostrum tapering moderately from base to apex. Symphysis of mandible short. Teeth $\frac{21}{21}$ to $\frac{25}{25}$, stout (6 to 7 millim. in antero-posterior diameter). Vertebræ: C. 7, D. 13, L. 17, C. 27; total 64.

T. tursio (Bonnaterre), with closely allied, if not identical, *T metis*, Gray, *T. eurynome*, Gray, *T. cymodice*, Gray, *T. aduncus*, Hemprich and Ehrenberg, and *T. gillii*, Dall.
T. catalania, Gray.

CLYMENIA, Gray, Synopsis of Whales and Dolphins, p. 6 (1868).
Clymene, Gray, P. Z. S. 1864, p. 237.
Prodelphinus, Gervais, Ostéog. des Cétacés, p. 604 (1880).

Rostrum rather variable. Symphysis of mandible short (less than one fifth of the length of the ramus). Teeth $\frac{30}{30}$ to $\frac{50}{50}$, small, not exceeding 3 millim. in diameter. Vertebræ 73 to 78.

This is a rather heterogeneous group, which may require division when better known. Four leading forms are distinguishable, the characters of which need not be repeated here, especially as they are not very easily defined. The principal species, real or nominal, which have been assigned to each are:—

1. *C. obscura*, Gray. *C. superciliosa* (Garnot and Lesson). *C. similis*, Gray. *C.* (*Electra*) *thicolea*, Gray.
2. *C. euphrosyne*, Gray. *C. styx*, Gray. *C. euphrosynoides*, Gray. *C. dorides*, Gray. *C. marginatus* (Duvernoy). *C. tethyos*, Gervais.
3. *C. dubia* (Cuvier). *C. doris*, Gray. *C. normalis*, Gray. *C. brevimana* (Hombron and Jacquinot). *C. frænata* (F. Cuvier). *C. frontalis* (Dussumier). *C.* (*Steno*) *attenuata* (Gray). *C.* (*Steno*) *capensis* (Gray).
4. *C. longirostris*, Gray. *C. stenorhyncha*, Gray. *C. roseiventris* (Hombron and Jacquinot). *C. microps*, Gray. *C. alope*, Gray.

Péron's Dolphin (*Delphinus leucorhamphus*, Péron, or *Leucorhamphus peronii* of Lilljeborg) resembles some forms of *Clymenia* in its cranial characters; but having no dorsal fin, it has been separated generically by some zoologists. The skeleton has not been described. Perhaps *D. borealis*, Peale, from the North Pacific, also without dorsal fin, and of which only the external characters are known, may be allied to it.

STENO, Gray, Zool. Erebus & Terror, p. 43 (1846).

Rostrum long, narrow, and compressed, very distinct from the cranium. Symphysis of the mandible as long as or longer than one fourth the length of the ramus. Teeth $\frac{21}{21}$ to $\frac{25}{25}$, of comparatively large size (5–6 millim. in diameter); surface of their crowns finely furrowed. Vertebræ: C. 7, D. 12, L. 15, C. 32; total 66.

S. rostratus (Cuvier), with the closely allied, if not identical, *S. compressus*, Gray, *S. reinwardtii* (Schlegel), and *S. perspicillatus* (Peters).

b. Pterygoid bones narrow, not uniting in the middle line; their inner borders not parallel, but diverging posteriorly.

SOTALIA, Gray, Cat. Seals & Whales Brit. Mus. 2nd ed. p. 393 (1866).

Cranial characters, except as regards the form of the pterygoid bones, much as in *Steno*. Teeth tolerably large (4–5 millim. in diameter), $\frac{30}{30}$ to $\frac{35}{35}$, with smooth enamelled surface. Vertebræ: C. 7, D. 12, L. 10–14, C. 22; total 51–55. Pectoral fin broad at the base, the breadth being caused by the considerable development and position of the two outer digits.

S. guianensis, Van Beneden, with the closely allied *S. brasiliensis*, Ed. Van Beneden.
S. pallida, Gervais. *S. tucuxi*, Gray.
S. sinensis (F. Cuvier).
S. plumbeus (Dussumier).
S. gadamu (Owen).
S. lentiginosus (Owen).

2. On a Specimen of Rudolphi's Rorqual (*Balænoptera borealis*, Lesson), lately taken on the Essex Coast. By WILLIAM HENRY FLOWER, LL.D., F.R.S., P.Z.S., &c.

[Received November 19, 1883.]

Early in the morning of the 1st of the present month some fishermen discovered a Whale alive in shallow water near the mouth of the River Crouch, in Essex. After considerable difficulty they succeeded in capturing and killing it. It was exhibited for some time at Southend, and was the subject of a Chancery suit regarding its ownership between the Lord of the Manor of Burnham, Sir Henry Mildmay, and the fishermen who caught it, which resulted in the former establishing his claim to it as a "royal fish."

Mr. J. T. Carrington, who saw it within two days of its capture, describes the colour of its back as a rich glossy black, which shaded to a brilliant white on the underparts, the flippers being black. The animal was a male.

When roughly cleaned, under Mr. Gerrard's superintendence, the bones and some other parts were removed to the prosector's room in the Society's gardens, where I had an opportunity of examining them on the 17th. It then became perfectly evident that the animal was a characteristic specimen of the species named above, apparently not quite adult.

The skull measured 6 feet 2 inches (1·880 m.) in length, and the complete vertebral column 22 feet 3 inches (6·780 m.), giving 28 feet 5 inches (8·660 m.) from the apex of the rostrum to the end of the last caudal vertebra in a straight line, all the intervertebral substances being preserved. The length of the animal in the flesh may therefore be taken at about 29 feet (8·840 m.). The numbers of the vertebræ of the different regions of the column were: cervical 7, dorsal 13, lumbar 15, and caudal 21; or 56 in all. The upper end of the first rib of both sides was deeply cleft into two distinct heads[1], the posterior of which was directly articulated to the end of the transverse process of the first dorsal vertebra; the anterior was connected by a considerable mass of ligamentous substance to the approximated terminations of the upper and lower transverse processes of the posterior cervical vertebræ. It may therefore be regarded as a cervical rib, the distal end of which has coalesced with the first thoracic rib, a condition well illustrated by the specimen in the Brussels Museum, described by me in the 'Proceedings' of the Zoological Society, 1864, p. 417, where, on the right side, it is still free[2]. The thirteenth rib had a very small head, and was not directly attached to the transverse process of the corresponding dorsal vertebra, which showed no appreciable articular expansion at its extremity as in all the preceding ribs. The sternum was small and mainly cartilaginous; its length is but 7 inches, and its greatest breadth not quite so much. Its form and mode of attachment to the broad ends of the first pair of ribs are shown in the annexed figure (p. 515) from a sketch made while they were still in connexion. The ossified portion was a broad lozenge-shaped or oval nucleus, which is all that remains in the hitherto described skeletons of immature individuals, and gives very little idea of the real form of this part of the skeleton. In perfectly adult animals the whole would probably ossify, and give a shape of sternum like that of *Balænoptera rostrata*, but with a shorter posterior limb to the cross. The chevron bones were twelve in number. The stylo-hyals had the broad flattened form characteristic of this species. The pelvic bones were very small and partly cartilaginous, 4½ inches long, flattened, with one border slightly concave, and the other convex, and having a rounded prominence near the middle. The pectoral fins were long and narrow, as in the Rorquals generally; the length from the head of the humerus to the extremity of the fin was 3 feet 9 inches (1·140 m.), the greatest breadth 9 inches (0·230 m.). The skin not having yet been removed, I can give no information about the number or form of the carpal bones or phalanges. The dorsal fin was preserved with the skeleton, and appeared large in proportion to the size of the animal, at all events in comparison with that of *B. musculus*. Its extremity is pointed, and its hinder border strongly concave, giving it a distinctly falcate form; its height above the general line of the back is 11 inches (0·280 m.), and the length of its base 1 foot 4 inches (0·406 m.).

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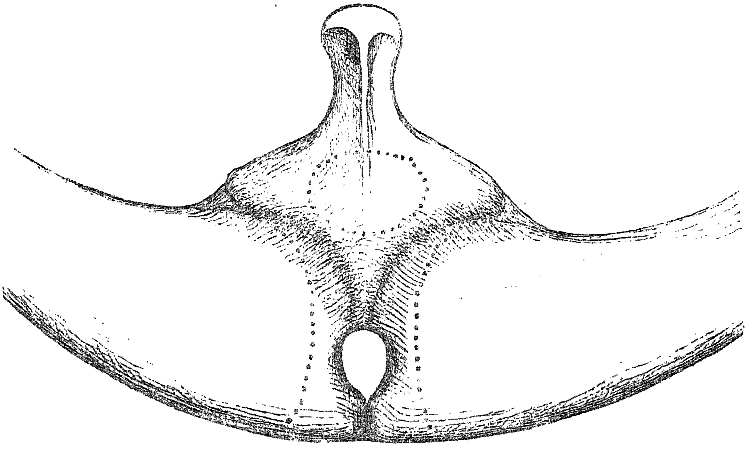
[1] As in all the specimens of this species hitherto described, except that recorded by Turner (Journ. Anat. & Physiol. April 1882).

[2] As an additional illustration to the numerous cases already recorded of the presence of cervical ribs in the Cetacea, I may mention that in a specimen of *Tursiops tursio*, prepared during the present year for the Museum of the Royal College of Surgeons, there is a pair of such ribs, each 52 millim. in length, articulated to the extremities of the transverse processes of the seventh cervical vertebra.



Balænoptera borealis.

Sternum and sternal ends of first pair of ribs in their natural relations; one fourth natural size. The dotted lines show approximatively the extent of ossification of the sternum and of the ribs.

The baleen was also fortunately preserved. The outer edge and greater part of each blade is black; but the inner edge and the hairy fringe of the larger blades and the small or subsidiary inner blades are almost pure white. The small blades at the posterior end of the series gradually change in colour from black to nearly white. The longest blades in the middle of the series are exactly 12 inches in length on the outer edge, to which about an inch may be added for the hairy fringe. To count the blades accurately is impossible, as they gradually degenerate at the extremities of the series, especially in front, into little more than bristles; but 300 on each side may be taken as a close approximation.

The osteological characters of this species of Rorqual are well known, from the description by Rudolphi[1] of a specimen stranded in 1819 on the coast of Holstein, the skeleton of which is still preserved in the Berlin Anatomical Museum; from the description which I gave in the 'Proceedings' of this Society for 1864 of two skeletons, one in the Leiden and the other in the Brussels Museum; and from the subsequent figures and descriptions of the same specimens published in the great work on the Osteography of the Cetacea by Van Beneden and Gervais. More recently P. Fischer has given some notes upon a young individual, stranded July 29th, 1874, between Bidart and Biarritz (Basses-Pyrénées), the skeleton of which is preserved in the Museum of Bayonne[2]; and Professor Turner has described an older one (about 38 feet long) which was captured near Bo'ness, in the Firth of Forth, in September 1872[3], the skeleton of which is now in the Anatomical Museum of the University of Edinburgh.

This is certainly the least common of the four species of Rorquals known to inhabit the North Atlantic, and the one of the occurrence of which in British waters there are fewest records. In fact, except the one just mentioned as described by Professor Turner, there is no other well-authenticated case; although it is possible that the Whale stranded at Charmouth, in Dorset, in 1840, described by Sweeting (P. Z. S. 1840, p. 11)[4], was one. Unfortunately none of its bones were preserved to authenticate its specific characters; and it might have been a young individual of one of the larger species, *B. musculus* or *B. sibbaldii*.

There has been considerable confusion about the nomenclature of this species, as of most other Whales.

The first specimen which came distinctly under the notice of any zoologist was that mentioned above, carefully described by Rudolphi, who, however, erroneously identified it with *B. rostrata* of Fabricius and Hunter, a distinct and well-known species. The skeleton was afterwards described under the name of "Rorqual du Nord" by Cuvier[5], who compared and contrasted it with the "Rorqual de la Méditerranée," which is now known as *B. musculus*. Lesson, in 1828[6], translated Cuvier's name into Latin, calling it *Balænoptera borealis*, but including under the same designation another specimen now known to belong to a different species; but still Rudolphi's Whale was the type. Fischer[7] also uses the same name for a number of Whales of several species, including Rudolphi's, which is placed second on the list, the first being an example of *B. rostrata*, miscalled by Albers *B. boops*.

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[1] Abhandl. der königl. Akad. zu Berlin, 1820, p. 27.

[2] "Cétacés du Sud-ouest de la France," Actes de la Société Linnéenne de Bordeaux, t. xxxv. 1881, p. 81; also 'Comptes Rendus,' t. lxxxiii. p. 1298, Dec. 27, 1876, and 'Journal de Zoologie,' v. p. 462, 1876.

[3] Journ. Anatomy and Physiology, April 1882, p. 471.

[4] See also Mag. Nat. Hist. 1840, p. 342, and Ann. & Mag. Nat. Hist. vi. p. 72, Sept. 1841.

[5] 'Ossemens Fossiles,' v. p. 564 (1823).

[6] 'Hist. Nat. des Cétacés' (Complément de Buffon), p. 342.

[7] 'Synopsis Mammalium,' p. 524 (1829).

In the great revision of the nomenclature of the Cetacea undertaken by Dr. Gray in the Zoology of the Voyage of the 'Erebus' and 'Terror' (1846), Rudolphi's Whale was called *Balænoptera laticeps*, an ill-chosen name, as the head is not wider proportionally than in other members of the genus. In Dr. Gray's next revision [1], the genus *Balænoptera* being divided into three, it appears as *Sibbaldius laticeps*, under which name I described the skeletons referred to above in the P. Z. S. for 1864. A still further subdivision of the genera of Whales by Dr. Gray in 1871 [2] resulted in the synonym of *Rudolphius laticeps*.

Lesson's specific name *borealis*, whether regarded as original or as a translation of Cuvier's designation, has undoubted priority, and has moreover received the sanction of Van Beneden and Gervais, being used in their magnificent work on the osteology of the Cetacea. It has also been adopted by P. Fischer in his valuable memoir on the Cetacea of the south-west of France [3].

The generic name is of course of much less importance, depending entirely upon whether it is considered expedient to retain Lacépède's genus *Balænoptera* in its integrity for all the Rorquals, or whether any of the subdivisions proposed by Dr. Gray should be adopted. Although these, especially in the later revisions, became far too numerous to be considered of generic value, being founded in many cases on mere individual variation, or on characters depending on immaturity (as *Benedenia*), there is perhaps something to be said for the original triple division into *Physalus*, *Sibbaldius*, and *Balænoptera*, which certainly represent three distinct sections of the group, characterized by osteological differences, described in my "Notes on the Whales in the Museums of Holland and Belgium," P. Z. S. 1864. As, however, we have still so much to learn of the Rorquals of other seas, and as the possibility of intermediate forms being discovered is not yet exhausted, I think it better for the present at least to retain the old generic designation for them all.

3. Additional Observations on the Structure of the Female Organs of the Indian Elephant (*Elephas indicus*). By M. Watson, M.D., Professor of Anatomy in the Owens College, Manchester.

[Received July 19, 1883.]

In a previous communication to this Society [4] I directed attention to the diversity of statement on the part of anatomists with regard to the structure of the female organs of the Indian Elephant. In that communication I pointed out that, while in the majority of specimens which had been examined a well-developed septum uteri existed, yet this septum varied in length in different specimens, and that in none, with the single exception of that which formed the subject of that communication, was the septum uteri complete, but fell short of the os uteri to a greater or less extent in different individuals. In none, moreover, was there the slightest trace of a vaginal septum with the exception of the specimen described by myself, in which the septum vaginæ, like the septum uteri, was complete, and of that described by Messrs. Miall and Greenwood[1], in which the septum vaginæ was reduced to the condition of a fibrous cord, which, stretching across the orifice of the vagina, led these authors to regard it as the representative of the hymen.

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[1] P. Z. S. 1864, p. 399.

[2] 'Suppl. Cat. Seals and Whales in Brit. Mus.' p. 54 (1871).

[3] Fischer cites the species as *B. borealis*, Cuvier, following the practice usual with French authors in the numerous cases in which Cuvier described species under a vernacular appellation without bestowing upon them any systematic Latin name.

[4] Trans. Zool. Soc. 1881, p. 111.

Having recently, through the kindness of Mr. Harniston of Southport, had an opportunity of examining the female organs of another young Indian Elephant, I have thought it might be well, in view of the diversity of statement above referred to, to put on record the result of a careful dissection of the female organs of this specimen. I shall, for the sake of comparison with my previous communication, class my observations under four heads:—1st, the condition of the septum uteri, including its relation to the body of the uterus; 2nd, the differentiation of a secondary vagina from the uterus on the one hand, and from the urogenital canal on the other; 3rd, the condition of the vaginal septum; and 4th, the number and position of the orifices which communicate with the commencement of the urogenital canal.

With regard to the first of these points, I found that the uterus presented the form already familiar to us through the researches of earlier observers. It consisted of an elongated corpus uteri, the exact dimensions of which I could not determine, as its anterior portion had been removed before the specimen fell into my hands. Enough of the organ, however, remained to show that, so far as the *external* form of the uterus was concerned, it did not differ from the specimen which I described and figured in the Transactions of the Society. The *interior* of the uterus was provided with a well-developed septum which, although it occupied the greater portion of the uterus (dividing it into lateral compartments), nevertheless failed to reach the os uteri, but ceased two inches in front of that orifice, at which point it presented a slightly concave or semilunar margin. In this specimen therefore, as in all which have been previously described, with the single exception of that formerly examined by myself, there was a unilocular corpus uteri, which measured two inches in length, the remainder and much the greater portion of the uterus being divided into two lateral compartments by means of a septum which extended from the junction of the uterine cornua backwards to within two inches of the os uteri.

With regard to the second point, the differentiation of a secondary vagina as distinguished from the uterus on the one hand and the urogenital canal on the other, I found in the specimen under consideration no difficulty in identifying this portion of the sexual canal. It was clearly recognizable externally from the uterus in front, as well as from the urogenital canal behind, by the greater thinness of its walls, while on opening it the cavity, which was of an oval form, was seen to be larger than that of the uterus, from which it was separated by a slightly puckered constriction which permitted the passage of a finger. Posteriorly the secondary vagina communicated with the urogenital canal by means of a *single* orifice which, smaller than that leading into the uterus, permitted of the insertion of an ordinary knitting-needle. This orifice was undefended by any valve. The mucous membrane of the secondary vagina, moreover, differed in character from that of the uterus, inasmuch as in the latter it was thrown into longitudinal plications, whereas in the secondary vagina the mucous membrane was uniformly smooth and devoid of rugæ. In all respects the secondary vagina of this specimen of the Indian Elephant agreed closely with the corresponding portion of the female organs of the African species as described by Perrault [1] and Forbes [2]. By Perrault the secondary vagina is described under the name of "corps ovale."

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[1] 'Studies in Comparative Anatomy,' vol. ii. p. 64.

The third point to be noticed in the anatomy of the specimen under consideration was the total absence of a vaginal septum, such as I found completely developed in that which I formerly described in the Transactions of this Society. In that specimen the uterine septum was complete, and extended from the junction of the uterine cornua in front, backwards to the os uteri behind, whence it was prolonged backwards along the whole length of the vagina to the opening of the latter into the urogenital canal by means of a well-developed septum vaginæ. In the present specimen, on the contrary, the septum uteri was incomplete, and there was a total absence of the septum vaginæ, which formed so exceptional a feature in the anatomy of the specimen which I formerly examined. In this respect the specimen under consideration agrees with every one of those which have been previously examined by other anatomists with the single exception of that described by Messrs. Miall and Greenwood, in which the septum vaginæ was represented only by a fibrous cord, which, stretching across the aperture of communication between the vagina and the urogenital canal, led those authors to regard it as the representative of a hymen.

With reference to the fourth point, the number of orifices which communicate with the commencement of the urogenital canal, I found that in the specimen under consideration there were four—firstly, the orifice of the urethra, which was situated below that of the secondary vagina; secondly, the orifice of the secondary vagina which was single, and was not divided into two separate apertures by the posterior extremity of the vaginal septum, as was the case in the specimen which I formerly described, and in that figured by Messrs. Miall and Greenwood, in which that septum was reduced to the condition of a fibrous cord; and thirdly, the two orifices of the canals of Gaertner, which were situated on either side of the os vaginæ, and therefore occupied the same position as in the specimen which I formerly described.

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[1] 'Mémoires pour servir à l'histoire naturelle des Animaux,' tome iii. p. 132.
[2] Proc. Zool. Soc. 1879, p. 431

The examination of the female organs of the Indian Elephant just described shows that we have not as yet arrived at an understanding of the normal configuration of these parts, and of the variations which they manifest in different specimens of the same species. In some, as in the specimens described by Stukeley, Hunter, Mayer, Miall and Greenwood, the corpus uteri was single, and the uterine septum fell short of the mouth of the uterus; while in at least one other, that described by myself in the Transactions of this Society, the uterus was divided into two compartments by a perfect septum uteri, which extended from end to end of that organ.

In some specimens, as in those described by Stukeley[1], Hunter[2], Owen[3], Miall and Greenwood, as well as in that formerly described by myself, a secondary vagina was clearly differentiated from the uterus in front, and from the urogenital canal behind; while in at least one other, that described by Mayer, the secondary vagina was not distinguishable as a distinct structure, but apparently formed part of the uterus. In some, as in the specimen just described, as well as in those described by Mayer, Hunter, and Owen, there was not the slightest trace of a vaginal septum; in others, such as that formerly described by myself in the Transactions of this Society, the vagina was divided from end to end by a complete septum; while in that described by Miall and Greenwood, and probably in that figured by Stukeley, the vaginal septum was represented by a fibrous cord which, stretching across the mouth of the vagina, divided that orifice into two.

In some specimens, as in that just described, and in those of Mayer, Hunter, and Owen, there were four separate orifices which communicated with the commencement of the urogenital canal, namely those of the single os vaginæ, of the urethra, and of the two canals of Gaertner; while in the specimen examined on a previous occasion by myself, as well as in that examined by Miall and Greenwood, the single os vaginæ was divided into two parts by the posterior extremity of the vaginal septum.

In the last-named specimens therefore there were five apertures which communicated with the urogenital canal, namely the two ora vaginæ, the orifices of the two canals of Gaertner, and the orifice of the urethra.

Further research is necessary to enable us to explain and reconcile the variations in structure of the female organs which are met with in different specimens of the Indian Elephant; and it is to be hoped that those who have an opportunity of investigating the structure of this animal will not lose sight of the fact that much

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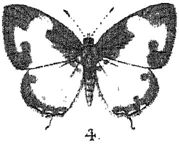
[1] 'On the Spleen, to which is added some Anatomical Observations on the Dissection of an Elephant.' London, 1723, p. 104.

[2] 'Essays and Observations,' vol. ii. p. 175.

[3] 'Anatomy of Vertebrates,' vol. iii. p. 692.



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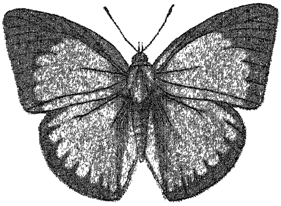

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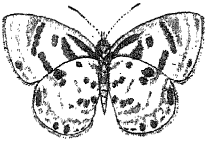

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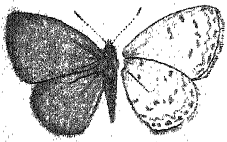

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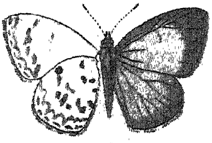

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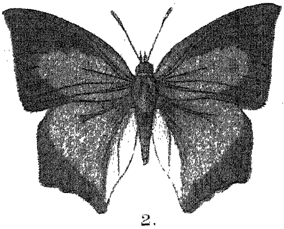

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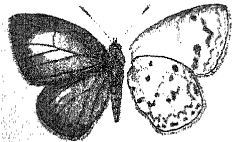

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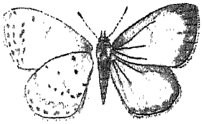

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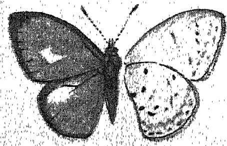

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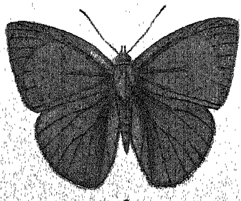

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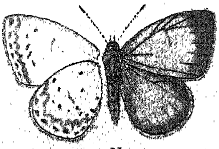

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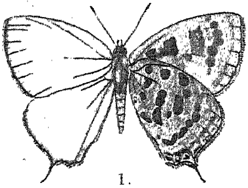
F. C. Moore, del et lith.

Mintern Bros. imp.

NEW INDIAN LEPIDOPTERA.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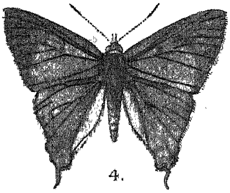
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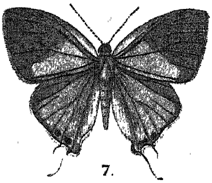
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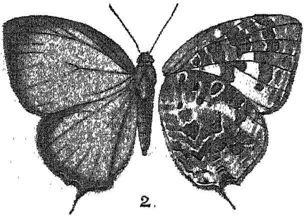
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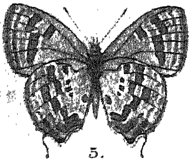
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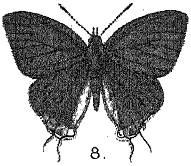
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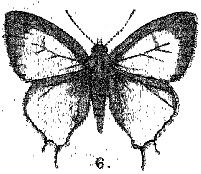
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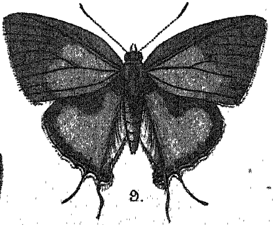
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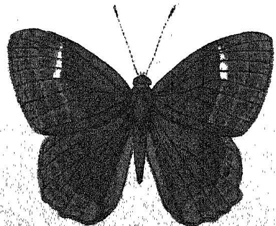
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C. Moore, del et lith.

Mintern Bros. imp.

NEW INDIAN LEPIDOPTERA.

yet remains to be done before we shall have arrived at an accurate knowledge of the entire anatomy of this animal.

Postscript. Since the foregoing pages were written, Dr. R. J. Anderson[1] has published in the 'Journal of Anatomy' a short account of the anatomy of an additional specimen of the Indian Elephant.

In this paper the author mentions the presence of a uterus, vagina, and genito-urinary passage, but communicates no particulars regarding the structure of these different parts of the female organs. Hence our knowledge of these organs and of the variations which they present in different specimens of the Indian Elephant remains in the same unsatisfactory state as before.

4. Descriptions of new Asiatic Diurnal Lepidoptera.

By F. Moore, F.Z.S., &c.

[Received September 12, 1883.]

(Plates XLVIII. & XLIX.)

Subfamily SATYRINÆ.

CALLEREBIA MODESTA, n. sp.

Male. Smaller than *C. nirmala.* Upperside similarly marked with smaller ocelli. Underside uniformly brown throughout both wings, the ocelli less distinctly bordered; hind wing with a well-formed small ocellus between the radial and upper median vein, in addition to that near anal angle.

Expanse $1\frac{6}{10}$ inch.

Hab. Gurhwal, N.W. Himalaya (*Capt. Beckett*). In coll. F. Moore.

Subfamily NYMPHALINÆ.

ENISPE TESSELLATA, n. sp.

Male and Female. Allied to *E. euthymius*: fore wing with broader marginal and submarginal bands, which are also confluent at their angles, the discal macular band composed of larger and confluent spots; there is also an inner band which runs into the upper discal streak, but which is less apparent on the hind wing; the discocellular lunular spot is also larger, the veins in crossing the disk are also black-lined: hind wing with three similar outer confluent bands, the linear inner band indistinct in the male; veins across the disk black-lined.

Expanse, ♂ $3\frac{1}{4}$, ♀ $3\frac{1}{2}$ inches.

Hab. Darjiling (*Grote*), Nepal (*Ramsay*). In coll. F. Moore.

Fam. LYCÆNIDÆ.

GERYDUS DRUMILA.

Miletus drumila, Moore, P. Z. S. 1865, p. 777, pl. 41. fig. 12, ♀.

Male. Upperside dark umber-brown: fore wing with a pale medial longitudinal fascia curving from lower end of the cell across the disk.

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[1] 'Journal of Anatomy and Physiology,' vol. xvii. p. 491.

Underside pale greyish brown: fore wing with two pale-bordered transverse marks within the cell, one at its end, and another below the middle mark, a submarginal series of very irregular-shaped marks, and with several small pale-bordered irregular spots disposed about the discal area; hind wing with three irregular-shaped pale-bordered cell-marks, four marks along anterior border, a discal confluent series ending at anal angle, two marks below the middle cell-mark, and three below the basal cell-mark, the middle one of the latter being black, small and round; interspersed between the marks are several pale-bordered irregular-shaped small spots.

Expanse, ♂ 2 inches.

Hab. Darjiling; Khasias. In coll. F. Moore.

SPALGIS NUBILUS, n. sp.

Male. Upperside violet-brown; fore wing with a slightly darker discocellular lunule. Underside greyish-white, with waved transverse blackish lines, and basal marks.

Female paler, with a very small indistinct paler space beyond the cell.

Expanse $\frac{11}{12}$ inch.

Hab. Andaman Isles. In coll. F. Moore.

Distinguishable from *S. epius* by the absence in the male of the prominent white discal spot, and the broad white discal area in the female; the markings beneath are more numerous and waved. It is also distinct from *S. dilama* (*Lucia dilama*, Moore, P. Z. S. 1878, p. 701), from Hainan.

CURETIS GLORIOSA, n. sp. (Plate XLVIII. fig. 1.)

Male. Dark coppery-red: fore wing with a blackish-brown marginal border curving broadly from base of the costa to posterior angle: hind wing also with a broad blackish-brown marginal border, and a suffused dusky basal area.

Female dark brown: fore wing with broad golden-yellow discal area, and hind wing with narrow curved discal streak.

Expanse 1$\frac{5}{8}$ to 1$\frac{7}{8}$ inch.

Hab. Silhet. In coll. F. Moore.

CURETIS ANGULATA, n. sp. (Plate XLVIII. fig. 2.)

Male. From typical *C. bulis* (Dbleday. and Hewits. D. Lep. pl. 75. f. 5) this differs in the fore wing being pointed and acuminated at the apex; the red area is paler and broader, extending to the posterior margin towards the base; the dentate mark at end of the cell is also prominent. On the hind wing the exterior margin is much produced to an angle in the middle, and the anal end more produced; the red area is also paler, and extends from the costal edge broadly over the disk, leaving only an exterior marginal blackish band and a suffused medial basal area. *Female* with similar outline of wings, and broad white discal areas.

Expanse 1$\frac{3}{4}$ inch.

Hab. N.W. Himalayas. In coll. F. Moore.

CURETIS ARCUATA, n. sp. (Plate XLVIII. fig. 3.)

Of smaller size than *C. thetys*, the fore wing less acuminate at the tip, the costal band comparatively broader, not jagged on its inner edge, and is curved below the apex to the posterior angle. On the hind wing the costal band spreads over the costal vein and extends to the end of the upper subcostal branch. *Female* with the white patch on fore wing confined more to the disk, and the curved white band on hind wing is narrower.

Expanse, ♂ ♀ $1\frac{4}{10}$ inch.

Hab. Malabar. In coll. F. Moore.

CASTALIUS INTERRUPTUS, n. sp. (Plate XLVIII. fig. 4.)

Fore wing white, with a blackish-brown broad costal band, which is widely interrupted to near the costal edge at end of the cell, the subapical inner angle of the band acute, the band then extending down the exterior margin and ascending above the posterior angle into a clavate knob to the disk: hind wing white, base slightly black-speckled; a very narrow marginal band traversed by white lunules along the outer edge. Underside marked similar to *C. decidia*.

Expanse 1 inch.

Hab. Bombay. In coll. F. Moore.

CYANIRIS PLACIDA, n. sp. (Plate XLVIII. fig. 5.)

Allied to *C. lavendularis*. *Male*. Upperside of a darker but duller blue and of a uniform tint throughout, *C. lavendularis* having the discal area of both wings slightly whitish; marginal black borders similar but slightly narrower. Underside similarly marked, except that in the fore wing there are but four transverse discal spots, which are also disposed in a more linear series.

Expanse $1\frac{2}{8}$ inch.

Hab. Darjiling. In coll. F. Moore.

CYANIRIS MARGINATA, n. sp. (Plate XLVIII. fig. 6.)

Allied to *C. puspa*. Both wings in the male with the black marginal border twice the width of those in *C. puspa*, the black costal border extending its width half across the cell; upper discal area of both wings also more prominently white. Female darker than in same sex of *C. puspa*, the pale discal area of less width. Underside similarly marked.

Expanse $1\frac{3}{8}$ inch.

Hab. Nepal (*Ramsay*); Darjiling. In coll. F. Moore.

CYANIRIS LATIMARGO, n. sp. (Plate XLVIII. fig. 9.)

Allied to *C. transpectus*. *Male*. Upperside of a darker blue, with a purplish tint; both wings with a broad black outer marginal band of one eighth inch in width; the costal border of both wings and the abdominal margin of hind wing also black-bordered. Underside with similarly disposed but broader markings than those in *C. marginata*.

Expanse $1\frac{2}{8}$ inch.

Hab. N.E. Bengal (*Grote*). In coll. F. Moore.

Cyaniris albidisca, n. sp. (Plate XLVIII. fig. 7.)

Allied to *C. puspa*. *Male.* Fore wing dark blue, with a narrow black marginal band decreasing to a point at posterior angle; hind wing with a narrow black, slightly macular, marginal band. Both wings with a prominent white discal patch. Underside white, with similarly disposed but more slender and less prominent markings than those in *C. puspa*.

Expanse $1\frac{2}{5}$ inch.

Hab. Nilgiris, S. India. In coll. F. Moore.

Cyaniris jynteana, n. sp. (Plate XLVIII. fig. 10.)

Near *C. puspa*. *Male.* Fore wing comparatively shorter, the blue less intense and slightly paler; the discal area slightly white-speckled; with a blackish outer marginal band of one twelfth inch in width: hind wing with a narrow macular marginal band. Underside greyish white: fore wing with a slender indistinct dusky-black discocellular streak, four transverse discal, outwardly oblique, short linear spots, a small costal spot, a submarginal and marginal row of lunular spots: hind wing with three small black subbasal spots, an irregular discal transverse series of nine spots, an indistinct submarginal and marginal row of dentate lunular spots.

Expanse $1\frac{1}{5}$ to $1\frac{2}{5}$ inch.

Hab. Khasia and Jyntea hills (*Austen*). In coll. F. Moore.

Cyaniris sikkima, n. sp. (Plate XLVIII. fig. 11.)

Allied to *C. Jynteana*. Fore wing shorter; hind wing also shorter and comparatively broader; the marginal blackish band on both wings broader; fore wing with a slender blackish discocellular streak. Underside similarly marked, the discal oblique spots being shorter, and the submarginal dentate lunules broader on both wings.

Expanse $1\frac{2}{10}$ inch.

Hab. Darjiling. In coll. F. Moore.

Niphanda plinioides, n. sp. (Plate XLVIII. fig. 8.)

Male and Female. Upperside violaceous-brown, with a very faint shade of violet-blue in some lights: fore wing with the discal interspaces between the veins whitish-brown, palest in the male, and traversed by an indistinct darker transverse discal fascia; a marginal row of black spots: hind wing with a marginal row of whitish-bordered black spots, of which the second and third from anal angle are the largest, and two parallel discal curved rows of small whitish spots; cilia alternated with whitish. Underside dirty white: fore wing with a blackish-brown slender streak ascending half length of upper base of the cell, a curved streak from below its base to middle of the cell, and a lunular spot at its end; an interrupted discal macular band, the upper part with a broad outer fascia, and a submarginal and a marginal lunular band; the latter with two blackish spots on its middle: hind wing with a blackish-brown spot at base of the cell, three subbasal spots, one on middle of abdominal margin, and two large spots on costal border, a smaller spot below the outer one, and a streak at end of the cell, an irregular discal series with paler brown outer borders, and an outer marginal row bordered by a submarginal paler lunular band, the second and third from the anal angle the largest. Base of palpi white beneath; legs white, with brown tarsal bands; antennæ annulated with white bands.

Expanse, ♂ $1\frac{2}{10}$, ♀ $1\frac{1}{10}$ inch.

Hab. Sikkim. In coll. F. Moore and H. J. Elwes.

Both sexes on the upperside have much the appearance of a dark female *Lycæna plinius* and *L. theophrastus*, but these insects are, structurally, quite distinct.

HORAGA MOULMEINA, n. sp.

Myrina syrinx, Hewitson, Ill. D. Lep. pl. 14. figs. 32, 33 (nec Felder).

Allied to *H. onyx*. *Male* differs in having a smaller and more trilobate-formed white discal spot. Underside of a much brighter ochreous colour; the discal band on fore wing only half the width of that in *H. onyx*, and does not extend above the subcostal vein; the band on hind wing narrower, regular, and of uniform width; anal and two subanal spots large. *Female* paler; underside also of the same brighter colour, and the band similar to that of male.

Expanse $1\frac{1}{10}$ to $1\frac{3}{10}$ inch.

Hab. Moulmein. In coll. British Museum.

The *H. syrinx* of Felder is an Amboina species.

HORAGA CINGALENSIS, n. sp.

Horaga ciniata, Moore, Lep. of Ceylon, i. p. 99, pl. 39. fig. 22*a* (nec Hewitson).

Male. Upperside very like *H. onyx*, the discal white spot smaller, the blue basal areas of similar tint. Underside very dark violaceous brownish-ochreous; the discal band on fore wing narrower but extending to the costa; the band on hind wing also narrower and much more regular; anal spots much less prominent.

Expanse $1\frac{1}{10}$ inch.

Hab. Ceylon. In coll. F. Moore.

A much smaller species and quite distinct from *H. ciniata*, which latter is confined to the Malay island of Batchian.

HORAGA SIKKIMA, n. sp.

Male. Differs from *H. onyx* in the lower basal and discal areas being of a darker blue tint; the discal white spot on fore wing intermediate in size. Underside of a slightly brighter ochreous tint than in *H. syrinx* of Hewitson, the discal band on fore wing somewhat broader, the band on hind wing very much narrower, being about the same width as in *H. viola*.

Expanse $1\frac{2}{10}$ inch.

Hab. Darjiling (*Grote* and *Atkinson*). In coll. F. Moore, and Hewitson Cabinet, British Museum.

ILERDA LANGII, n. sp.

Near to *I. moorei*. Both wings with the metallic area of the same extent and shape as in that species, the metallic colour being of a greenish tint of nearly the same intenseness as that in *I. androcles*. On the hind wing the marginal red band is composed of four or five broad continuous lunules. In both the former named species the marginal band is composed of only two lunules. Underside of a much darker yellow than in the former species.

Expanse $1\frac{1}{4}$ inch.

Hab. Masuri, N.W. Himalaya. In coll. F. Moore.

APHNÆUS ABNORMIS, n. sp. (Plate XLIX. fig. 4.)

Male. Fore wing dusky violet-brown; basal area from below the costal vein dull greenish-grey, or in certain lights pale blue: hind wing of the same dull greenish-grey or light blue; the marginal line brown; anal lobe dull ochreous-brown. Underside dull ochreous-brown; fore wing with three indistinctly defined oblique, transverse, very slightly silvered bands and submarginal line: hind wing with a similar medial transverse band and less distinct submarginal band.

Expanse $1\frac{1}{2}$ inch.

Hab. Coonoor, Nilgiris (*Lindsay*). In coll. F. Moore.

Genus SITHON.

Sithon, Hübner, Verz. bek. Schmett. p. 77 (1816).

Fore wing with the costa slightly arched at the base, apex acute, exterior margin very slightly convex, posterior angle not acute, posterior margin slightly convex, tufted beneath; costal vein recurved; first subcostal branch ascending and touching costal near its end, emitted at one third before end of the cell, second branch at one fifth, third and fourth from end of the cell, no fifth branch; cell broad; discocellulars slightly concave, of equal length; radial from their middle; middle median from close to end of the cell, lower at one third before the end; submedian straight. Hind wing oval; costa almost angular in its middle, apex convex, exterior margin lobular near anal angle; cell short, triangular; first subcostal emitted at one third before end of the cell; discocellulars oblique, recurved; radial from their middle; two median branches from end of the cell, lower at one half before the end, submedian straight, internal recurved; furnished with a longish slender tail from end of lower median vein, and a short lobate tail from submedian vein. Antennal club slender; palpi porrect, laxy squamose beneath, second joint extending half beyond the head, third joint slender; legs squamose.

Type *S. nedymond*, Cram.

SITHON NEDYMOND.

Papilio nedymond, Cram. Pap. Exot. iv. pl. 299. f. E, F (1782).

Thecla nedymond, Horsfield, Catal. Lep. Mus. E.I. C. p. 96 (1829).

Sithon nedymond, Hübner, Verz. bek. Schmett. p. 77 (1816); Kirby, Catal. D. Lep. p. 414.

Hab. Java; Sumatra.

SITHON INDRA, n. sp.

Allied to *S. jalindra.* Differs from typical Javan specimens in the male having comparatively broader brown exterior borders on both wings. In the female the hind wing has four small obsolescent widely separated blue-grey lower submarginal spots above the blackish marginal spots, the anal black spot being surmounted with red; in the Java type of female the hind wing has a broad blue-grey lower marginal band and blue-grey speckled anal spot. Underside whiter; both wings with narrower upper discal brown band; the subanal spot with much less red border.

Expanse $1\frac{3}{8}$ to $1\frac{4}{8}$ inch.

Hab. Bengal (*A. E. Russell*). In coll. F. Moore.

HYPOLYCÆNA CACHARA, n. sp. (Plate XLIX. fig. 6.)

Near to *H. kina*, Hewitson. *Male.* Upperside pale purplish violet-grey: fore wing with the costal and outer border more narrowly pale blue-black than in *H. kina*; no band on the posterior border; a slight spot at upper end of the cell: hind wing with the costal border slightly pale blue-black. Underside greyish white: fore wing with a blackish discocellular lunular mark, a continuous discal band, and two marginal less distinct lunular bands: hind wing with a blackish discocellular mark, a discal band composed of three upper portions and a lower zigzag line; two marginal less distinct lunular bands and a yellow-bordered black anal and a subanal spot; a small spot also on costal border.

Expanse $1\frac{1}{8}$ to $1\frac{2}{8}$ inch.

Hab. N.-Cachar hills (*G.-Austen*). In coll. F. Moore.

HYPOLYCÆNA GROTEI, n. sp. (Plate XLIX. fig. 5.)

Allied to *H. nasaka* and *H. chandrana.* Upperside dark brown; lower discal area of both wings violet-blue. Underside brownish grey: fore wing with a white-bordered brown band crossing end of the cell, a broken similar bordered discal band, and a marginal row of lunular spots: hind wing with a white-bordered black subbasal anterior spot and two similar spots in middle of the cell, a white-bordered brown band at end of the cell, a broken zigzag similar discal band, and a marginal upper row of five annular spots; the three lower marginal spaces ochreous red, the anal and third with a black central spot, and the middle with a silver streak, these three anal spaces being bordered above by a silver line.

Expanse 1 inch.

Hab. N.E. Bengal (*Grote*). In coll. F. Moore.

HYPOLYCÆNA NILGIRICA, n. sp. (Plate XLIX. fig. 8.)

Allied to *H. othona.* *Female.* Upperside reddish-brown: fore wing olivaceous-brown along the costal border: hind wing with three red subanal marginal lunules and a white anal lobe-spot. Underside greyish-white: fore wing with a very indistinct blackish discocellular lunule, a submarginal lunular line with the upper end composed of double lunules, and a marginal lunular line: hind wing with a more distinct black discocellular lunular mark, submarginal and marginal lunular line, the upper end of the submarginal line composed of double lunules; a black spot on the costa near the base, and a lobe and subanal black spot, the two latter slightly yellow, surmounted with dark yellow.

Expanse $1\frac{2}{10}$ inch.

Hab. Coonoor, Nilgiris (*Lindsay*). In coll. F. Moore.

VADEBRA, n. g.

Intermediate between *Nadisepa* and *Rapala*. *Male* with the outline of the wings more of the form of the latter; the fore wing, however, is more acuminate, the exterior margin more oblique and even; marginal tuft the same; hind wing somewhat broader posteriorly; glandular depression prominent. Palpi smoother; antennal club longer and more pointed.

Type *V. petosiris.*

VADEBRA PETOSIRIS.

Deudorix petosiris, Hewitson, Illust. D. Lep. p. 22, pl. 9. figs. 30, 31 (1863).

Hab. Darjiling.

VADEBRA PHERETIMA.

Deudorix pheretima, Hewitson, Illust. D. Lep. p. 21, pl. 9. figs. 27, 29 (1863).

Hab. Burmah (Tounghoo), Singapore; Sumatra.

VADEBRA SUFFUSA.

Deudorix suffusa, Moore, P. Z. S. 1878, p. 834, ♂.

Hab. Tenasserim.

VADEBRA LANKANA.

Deudorix lankana, Moore, P. Z. S. 1879, p. 141, ♀; Lep. of Ceylon, i. p. 103, pl. 39. fig. 5.

Hab. Ceylon.

LEHERA, n. g.

Artipe[1], Boisd. Lep. Guat. p. 14 (1870).

Male. Wings large, broad: fore wing triangular; first subcostal branch emitted at nearly half before end of the cell, second at one fourth, third bifid, emitted from near end of the cell, the fourth at half from below third and terminating at the apex, fifth from end of the cell; discocellular slightly recurved, radial from the middle; the middle median branch at one fifth before end of the cell, lower at one third before the end; submedian recurved; no tuft on the posterior margin: hind wing broadly ovate, exterior margin slightly sinuous below the apex; anal lobe large; furnished with a single long slender tail; no costal glandular patch; costal vein much arched and terminating at the apex; first subcostal emitted at one third before end of the cell; discocellular oblique, radial from the middle; the middle median emitted at one eighth before end of the cell, lower at nearly one half before the end; submedian straight; internal vein recurved. Body very robust; antennæ with a long thickened club.

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[1] *Artipus* used by Schönherr for Coleoptera, in 1826.

Type *L. eryx*.

LEHERA ERYX.

Papilio eryx, Linn. Mant. Plant. p. 537 (1771).

Papilio amyntor, Herbst, Nat. Schmett. xi. pl. 300. figs. 5, 6 (1804).

Deudorix amyntor, Hewits. Ill. D. Lep. pl. 8. f. 18, 20, ♂ (1863).

Hab. Darjiling, Silhet, Assam.

TAJURIA JEHANA, n. sp. (Plate XLIX. fig. 7.)

Allied to *T. longinus*. Smaller in expanse. Both sexes with the posterior areas slaty-blue; hind wing with three black marginal spots from the anal lobe, and in the female a submarginal brownish zigzag band. Underside greyish creamy-white: fore wing with a slender indistinct black submarginal line: hind wing with the submarginal line more distinct and zigzag; a prominent anal and subanal black spot, each surmounted inwardly by a yellow lunule; the intermediate space between the spots black-speckled.

Expanse, ♂ ♀ 1¼ inch.

Hab. Lucknow. In coll. F. Moore.

PRATAPA LILA, n. sp. (Plate XLIX. fig. 9.)

Near to the S.-Indian *P. deva*. Both wings with the blue of a purple tint, less metallic in lustre, and confined to a smaller space on the lower basal area, thus giving a broader black outer border. Underside of a darker tint, with much more prominent transverse black sinuous line, and brownish marginal fasciæ; the anal spots also larger and broader-bordered with red. Female also with a broader brown border.

Expanse, ♂ $1\frac{4}{8}$, ♀ $1\frac{5}{8}$ inch.

Hab. Silhet, E. Bengal. In coll. F. Moore.

Genus CAMENA.

Camena, Hewitson, Ill. D. Lep. p. 47 (1865).

Fore wing triangular; costa arched at the base, apex pointed, exterior margin convex below the apex, posterior margin convex in the middle and with a tuft of hair beneath; cell recurved, long; first subcostal emitted at half length of the cell, second at one third, thrid at one eighth, fourth at one half from below third, fifth from end of the cell; upper discocellular short, oblique, lower slightly concave, radial from their angle; middle median from one eighth and lower from one third before end of the cell; submedian straight. Hind wing broadly conical; with a glandular depression at base of subcostal: costal margin much arched, exterior margin sinuous, abdominal margin long; furnished with two tails, anal angle lobed; costal vein abruptly arched at the base and curved towards the middle; first subcostal emitted at one half before end of the cell; the cell broad; discocellulars obliquely recurved; radial from their middle; the middle median emitted at one fifth and lower at nearly one half before end of the cell; submedian straight, internal vein much recurved. Body very robust; abdomen short; palpi porrect, second joint not extending beyond the head, third joint very long, two thirds the length of second, slender and pointed at tip; fore femora slightly pilose beneath; antennal club stout.

Type *C. ctesia*.

CAMENA CTESIA.

Camena ctesia, Hewitson, Ill. D. Lep. p. 48, pl. 20. figs. 1, 2 (1865).

Hab. Darjiling.

CAMENA CIPPUS.

Hesperia cippus, Fabr. Ent. Syst. Suppl. p. 429 (1798).

Iolaus cippus, Hewitson, Ill. D. Lep. Suppl. p. 11, pl. 4. figs. 39, 40 (1869).

Hab. Nepal (*Ramsay*).

SURENDRA TODARA, n. sp.

Male. Upperside dark violet-brown: fore wing with the basal area below the costal vein pale violet-blue; hind wing uniformly brown. Underside pale ochreous-brown, indistinctly grey-speckled: fore wing with a discal transverse indistinct white lunular line and two less distinct marginal lines: hind wing with a subbasal and two discal transverse white lunular zigzag lines, a small black subanal spot surmounted with ochreous-red.

Expanse $1\frac{1}{4}$ inch.

Hab. Coonoor, Nilgiris (*Lindsay*). In coll. F. Moore.

In this species the fore wings are narrower than in its allies, and the hind wing more convex. It is quite distinct from the Madras species, *S. biplagiata*, Butler, the figure of which (P. Z. S. 1883, pl. 24. fig. 12) does not well represent the angular margin of the hind wing of the type specimen.

PANCHALA PARAGANESA.

Amblypodia paraganesa, De Nicéville, Journ. Asiatic Soc. Bengal, 1882, p. 63.

Amblypodia ganesa, Hewitson (nec Moore).

Nearest to *P. ganesa*. Both wings violet-brown, with the discal areas of a purplish-violaceous blue: fore wing with the blue colour confined to a narrow oval area, including the cell: hind wing with a long slender tail from end of lower median vein; the blue colour confined to the medial area; a marginal row of indistinct whitish double lunules. Underside with similarly disposed markings to those in *P. ganesa*, those on the fore wing being dark chocolate-brown, and the interspaces between the cell-marks also of the same colour: hind wing with chocolate-brown markings and basal interspaces, the markings also mostly with pale centres.

Expanse $1\frac{2}{10}$ inch.

Hab. Nepal (*Genl. Ramsay*). In coll. F. Moore.

Panchala birmana, n. sp.

Allied to *P. ganesa*. *Male.* Upperside with similar blue discal areas, that on the fore wing being confined more to the base. Underside dark brown: fore wing with similar but much darker and broader markings, which have whiter borders, the interspace between the second and third cell-spots and between the latter and the discal band of the same dark brown as the wing, not white as in *P. ganesa*: hind wing with very similar markings, but all dark brown and with white borders; anal lunules blue-speckled. *Female.* Upperside with darker blue, extending from the base broadly over the discal area. Underside as in male.

Expanse $1\frac{3}{8}$ inch.

Hab. Toungu, Brttish Burmah. In coll. H. G. Smith.

Nilasera pirithous, n. sp.

Allied to *N. nakula*. Differs in the male on the upperside being of a pale purplish-blue; both wings also with a black narrow marginal band. Female also of a brighter purple-blue. Underside darker; markings on fore wing less distinct, the inter-discal space bordering the lunular bands dusky purplish iron-grey; hind wing with similarly disposed markings, which are all dusky purplish iron-grey: these markings are most strongly defined in the male.

Expanse 2 to $2\frac{1}{4}$ inches.

Hab. N.E. Bengal, Assam. In coll. F. Moore.

Note.—*N. centaurus* and *N. pseudocentaurus* are both distinct from the above.

Nilasera opalina. (Plate XLIX. fig. 1.)

Male. Upperside pale purplish lilac-blue; cilia cinereous-grey. Underside pale lilacine greyish-brown; fore wing with a white-bordered brown mark within the cell, a broad similar coloured mark beyond the cell, and a chain-like discal band, beyond which are two marginal slender, indistinct, whitish lunular lines; posterior border of the wing greyish-white: hind wing with three transverse basal, four subbasal, one discocellular, and a curved series of eight discal white-bordered brown spots, beyond which are two marginal whitish lunular lines, with green-speckled anal spot.

Expanse $1\frac{1}{2}$ inch.

Hab. Khasia hills (*G.-Austen*). In coll. F. Moore.

NILASERA SUBFASCIATA, n. sp. (Plate XLIX. fig. 2.)

Upperside pale purplish cobalt-blue: fore wing with a purple-brown band curving from base of costa broadly before the apex to posterior angle: hind wing with a paler brown costal and outer marginal band. Underside purplish-brown: fore wing with a white ringlet and two cross bars within the cell, followed by two irregular white bars from end of the cell, an irregular chain-like discal band and interrupted submarginal lunules; two brown spots below the cell, with the discal interspaces white: hind wing with two basal white ringlets, two within the cell, a letter-V mark above it, a ringlet beneath the cell, two discal, very irregular curved chain-like bands, and two indistinct submarginal lunular lines; anal angle blackish, speckled with green scales; a prominent white fascia traversing the wing from abdominal margin below the cell to the apex.

Expanse $1\frac{1}{3}$ inch.

Hab. Tavoy, Burmah. In coll. F. Moore.

Fam. ERYCINIDÆ.

ABISARA ABNORMIS, n. sp. (Plate XLIX. fig. 3.)

Male. Dark plum-colour: fore wing with a series of distinct whitish spots outwardly bordering the medial dark angular fascia, its lower border pale, and the submarginal fascia also distinctly pale: hind wing less angular on middle of the exterior margin, the apical and anal black spots very indistinct. Underside with a very distinct white angular medial fascia crossing both wings; the submarginal line on fore wing also whitish and slender: hind wing with a continuous marginal row of black conical white-bordered spots.

Expanse $1\frac{8}{10}$ inch.

Hab. Moulmein, British Burmah. In coll. F. Moore.

ABISARA FRATERNA, n. sp.

Nearest to the Ceylonese *A. prunosa*. Both sexes smaller in size. *Male* duller-coloured; fascia broader. *Female* of a brighter red colour, the transverse medial dark fascia more decidedly angular in the middle, the two outer fasciæ and the marginal line whitish.

Expanse, ♂ $1\frac{3}{5}$, ♀ $1\frac{4}{5}$ inch.

Hab. Bombay (*Wilkinson*). In coll. F. Moore.

Fam. HESPERIDÆ.

BAORIS SCOPULIFERA, n. sp.

Male and Female. Dark vinous-brown. *Male.* Fore wing with two minute semidiaphanous spots before the apex, two at end of the cell, and two larger angular spots on the disk; hind wing with a tuft of long blackish hair which covers a dark maronne velvety patch within the cell. Underside paler; spots on fore wing as above; also with a large glossy purple space below the cell enclosing a maronne-brown patch of raised scales. *Female.* Fore wing with larger spots, also having a minute spot between the apical and discal series, and a small yellow spot above the hind margin; underside similarly marked.

Expanse, ♂ ♀ $1\frac{5}{8}$ inch.

Hab. Andamans. In coll. F. Moore.

Allied to *H. oceia*, Hewits., Desc. of Hesp. p. 31, from the Philippines.

BAORIS UNICOLOR, n. sp.

Male. Uppperside dark vinous-brown; fore wing without any markings whatever; hind wing with a tuft of blackish hairs as in *H. oceia.* Cilia cinereous-brown. Underside uniformly brown; fore wing with a glossy purple space on hind margin enclosing a small dark brown patch.

Expanse $1\frac{7}{10}$ inch.

Hab. Darjiling. In coll. F. Moore.

BAORIS AUSTENI, n. sp.

Male and Female. Upperside dark brown. *Male*: fore wing with two small semihyaline white spots at end of the cell, two before the apex, and three obliquely on the disk, the two upper of which are small. *Female* with markings the same, but slightly larger; also with a small yellow spot above the hind margin; cilia cinereous white. Underside as above; both sexes having also a slight yellowish patch above the hind margin.

Expanse, ♂ $1\frac{3}{8}$, ♀ $1\frac{5}{8}$ inch.

Hab. Khasia hills; Cherra Pungi (*G.-Austen*). In coll. F. Moore.

This species is allied to *H. cahira*, from the Andamans, and to *H. moolata*, from Tenasserim.

ISOTEINON VINDHIANA, n. sp.

Male. Upperside dark olive-brown; cilia cinereous: fore wing with a small yellow semitransparent spot at upper end of the cell, three conjoined subapical spots, two discal spots, and a small oval spot above the submedian vein. Underside dusky ochreous: fore wing with the posterior area broadly black; spots as above: hind wing with a yellow lunule at end of the cell, a small spot above it, and five discal spots.

Expanse $1\frac{2}{12}$ inch.

Hab. Jubbulpore (*Span*). In coll. F. Moore.

ISOTEINON NILGIRIANA, n. sp.

Male. Allied to *I. vindhiana*: fore wing with similarly disposed spots, which differ in being white, somewhat smaller, narrower, and the subapical conjoined spots disposed in a smaller row; the spot above submedian obsolescent. Underside uniformly ochreous-brown: fore wing with the spots as above, the submedian obsolete: hind wing with a small dusky black spot at end of the cell, and a dusky black discal row of spots.

Expanse $1\frac{2}{12}$ inch.

Hab. Coonoor, Nilgiris (*Lindsay*). In coll. F. Moore.

ISOTEINON MODESTA, n. sp.

Female. Allied to *I. nilgiriana*: fore wing narrower and less triangular in shape, with a minute very indistinct spot at upper end of the cell, two similar minute subapical spots, and two discal spots. Underside brownish-ochreous, grey-speckled; fore wing with spots as above; hind wing immaculate.

Expanse 1½ inch.

Hab. Coonoor, Nilgiris (*Lindsay*). In coll. F. Moore.

BARACUS SUBDITUS, n. sp.

Female. Differs from same sex of *B. vittatus* (*Isoteinon vittatus*, Felder) on the upperside, in being of a uniform olive-brown: fore wing with three somewhat indistinct small olivaceous-yellow subapical spots, below which are four similar spots, the two lower of which are very indistinct: hind wing uniformly olive-brown. Underside similar to that of *B. vittatus*, except that the fore wing has no subapical or anal spots, and the intermediary streaks on the hind wing are more prominent.

Expanse 1¼ inch.

Hab. Coonoor, Nilgiris (*Lindsay*). In coll. F. Moore.

PARNARA CANARAICA, n. sp.

Male and Female. Upperside dark brown, basal area olive-brown. *Male*: fore wing with two small oval semidiaphanous white spots at end of the cell, three spots obliquely before the apex, and three on the disk: hind wing without markings: cilia brownish-cinereous. Underside paler brown, irrorated with ochreous scales which are thickly disposed along the costa and apex of fore wing, and across discal area of hind wing: fore wing marked as above, also with a small whitish spot above hind margin: hind wing with two discal white spots. *Female*: fore wing with larger spots as in the male, also with a minute dot beneath the lower discal spot and a triangular yellow spot above hind margin: hind wing with three discal semidiaphanous spots. Underside: fore wing as above: hind wing with four discal white spots, and a fifth at end of the cell.

Expanse, ♂ 1 $\frac{4}{8}$, ♀ 1$\frac{7}{8}$ inch.

Hab. Canara (*Ward*). In coll. F. Moore.

TAGIADES ALBOVITTATA, n. sp.

Male. Upperside dark fuliginous-brown: fore wing with three minute transparent dots obliquely before the apex: hind wing with a narrow pure white anal band of one eighth inch in width: cilia of band white. Underside brown; the minute dots on fore wing scarcely visible: hind wing with the white colour extending upwards and nearly covering the whole wing. Body dark brown; palpi and abdomen beneath white; legs brownish.

Expanse 1½ inch.

Hab. Borneo. In coll. F. Moore.

EXPLANATION OF THE PLATES.

Plate XLVIII.

Fig. 1. *Curetis gloriosa*, n. sp., p. 522.
2. —— *angulata*, n. sp., p. 522.
3. —— *arcuata*, n. sp., p. 523.
4. *Castalius interruptus*, n. sp., p. 523.
5. *Cyaniris placida*, n. sp., p. 523.
6. —— *marginata*, n. sp., p. 523.
7. —— *albidisca*, n. sp., p. 524.
8. *Niphanda plinioides*, n. sp., p. 524.
9. *Cyaniris latimargo*, n. sp., p. 523.
10. —— *jynteana*, n. sp., p. 524.
11. —— *sikkima*, n. sp., p. 524.

Plate XLIX.

Fig. 1. *Nilasera opalina*, n. sp., p. 531.
2. —— *subfasciata*, n. sp., p. 532.
3. *Abisara abnormis*, n. sp., p. 532.
4. *Aphnæus abnormis*, n. sp., p. 526.
5. *Hypolycæna grotei*, n. sp., p. 527.
6. —— *cachara*, n. sp., p. 527.
7. *Tajuria jehana*, n. sp., p. 529.
8. *Hypolycæna nilgirica*, n. sp., p. 527.
9. *Pratipa lila*, n. sp., p. 529.

5. On a remarkable Variety of the Leopard (*Felis pardus*), obtained in the East of the Cape Colony. By R. Trimen, F.R.S., F.Z.S.

[Received September 12, 1883.]

In the Albany Museum, at Grahamstown, I have lately seen a mounted skin of *Felis pardus*, which differs much from any specimen that I have previously met with. It is that of a full-grown animal, but its sex is not noted.

In this example the most noteworthy character is the abundance of small black simple spots, almost to the exclusion of the ordinary "rose" or "ring" spots. The small spots are very numerous on the forehead and sides of the head, all along the dorsal tract, on both sides all over the middle of the body, and also on the shoulders and outer sides of the fore legs. Imperfect rose-spots are observable on the paler spaces on the sides of the neck, of the body behind the shoulders, and of the thighs. The fur of the tail is of a sandy colour, spotted and mixed with fuscous, the terminal portion being grizzled fuscous.

This specimen is labelled "Bucklands, near Koonap—presented by Mr. Buckley, August 1870." The Catalogue of the Albany Museum mentions it as a cross between the ordinary and black Leopards; but I believe the well-known black form of the Leopard has never been met with in South Africa (if in Africa at all), the specimens recorded being from India, Java, and Sumatra. I should thus prefer to regard this Cape specimen as an interesting aberration in the direction of the complete melanism of the so-called *Felis melas*.

6. Liste des Oiseaux recueillis par MM. Stolzmann et Siemiradzki dans l'Ecuadeur occidental. Par le Comte H. v. Berlepsch et L. Taczanowski.

[Received September 28, 1883.]

(Plate L.)

M. Jean Stolzmann, après son retour d'Europe, pour entreprendre de nouveau son exploration au Pérou, a trouvé l'impossibilité d'y continuer ses travaux, à cause des événements de la guerre, dans laquelle malheureusement cette république est engagée. Il s'est dirigé donc dans la république de l'Ecuadeur, et commença par la région occidentale de ce pays.

Pendant ce voyage M. Stolzmann a pour compagnon M. le Docteur Joseph Siemiradzki, géologiste, qui outre les études de sa spécialité, a aussi collectionné des oiseaux pour le Musée Berlepsch. C'est la raison pour laquelle nous avons fait en commun la liste des collections de ces deux voyageurs.

Les oiseaux de cette liste ont été recueillis principalement dans deux localités—c'est à dire, aux environs de Guayaquil et à Chimbo, ou Puente de Chimbo, pour le distinguer de Chimbo, situé au voisinage de Bodegas. Chimbo est situé au nord-est de Guayaquil, au bord de la rivière du même nom, élevé à 1100 pieds au-dessus de la mer. Les montagnes environnantes sont couvertes d'une magnifique forêt chaude, semblable à celle du Palmal.

Les autres localités où nos voyageurs ont aussi collectionné sont:— Yaguachi près de Guayaquil, et Cayandeled, à peu près à 4000 pieds au-dessus de la mer, dans les forêts du versant occidental des Andes. Toute la collection est faite depuis août jusqu'en décembre 1882.

En 1858 et 1859 M. Louis Fraser a collectionné dans les contrées voisines, c'est à dire à Babahoyo ou Bodegas, sur la rivière du même nom, à 200 lieues N.E. de Guayaquil, et 200–250 pieds au-dessus de la mer, en août et septembre 1859, et à Pallatanga, pueblo situé sur un bras du Rio Chimbo, depuis l'août jusqu'en décembre de 1858.

Les relations de M. Sclater sur ces collections[1] étaient d'une grande importance pour notre travail, car la faune ornithologique de Babahoyo est la même que celle de Guayaquil et de Yaguachi, tandis que celle de Pallatanga correspond à la faune de Chimbo. Les collections étaient riches de ces deux localités (165 espèces de Pallatanga et 137 de Babahoyo) dont un bon nombre a été décrit par M. Sclater comme espèces nouvelles.

Malgré cela nos deux voyageurs ont réussi à ajouter des nouvelles données pour la faune ornithologique de la contrée.

Nous avons trouvé dans leurs collections six espèces suivantes qui nous paraissent être nouvelles pour la science:—

Hylophilus minor.
Phœnicothraupis stolzmanni.
Chrysomitris siemiradzkii.
Automolus assimilis.
Leptoptila pallida.
Aramides wolfi.

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[1] Voyez P. Z. S. 1859, pp. 135 et 147; 1860, pp. 63, 73, 272 et 290.

Il nous a fallu encore de distinguer quelques-unes des espèces qu'on avait eu tort de confondre avec des autres formes connues, comme :—

Euphonia hypoxantha, confondue avec l'*E. crassirostris*, Scl.
Calliste cyanopygia „ „ la *C. cyaneicollis*, O. et L.
Ornithion sclateri „ „ l'*O. imberbe*, Scl.

Il nous a paru également utile de distinguer plusieurs formes, bien reconnaissables, comme races locales, auxquelles nous avons préféré de garder le nom spécifique, en ajoutant celui de race; comme :—

Turdus ignobilis, maculirostris.
Troglodytes furvus, albicans.
Vireosylvia chivi, griseobarbata.
Chlorophanes spiza, exsul.
Tanagra palmarum, violilavata.
Spermophila gutturalis, olivacea.
Leptopogon superciliaris, transandinus.
Rhynchocyclus peruvianus, æquatorialis.
Dendrornis erythropygia, æquatorialis.
Gouldia conversi, æquatorialis.
Chætura sclateri, occidentalis.

En outre il y a 22 oiseaux trouvés pour la première fois dans ce pays, comme :—

Turdus obsoletus.
Atticora tibialis.
Tachyphonus xanthopygius.
Gnathospiza raimondi.
Neorhynchus nasesus.
Spermophila telasco.
Spermophila obscura.
Sycalis flaveola.
Todirostrum sclateri.
Capsiempis flaveola.
Myiopatis tumbezana.
Myiozetetes cayennensis.
Rhynchocyclus peruvianus, æquatorialis.
Synallaxis fruticicola.
Philydor erythronotus?
Rhamphocænus rufiventris.
Myrmia micrura.
Chætura sclateri, occidentalis.
Chætura spinicauda.
Panyptila cayennensis.
Picumnus sclateri.
Penelope cristata.

La collection renferme aussi des exemplaires de quelques espèces très rares, décrites dans les derniers temps, comme :—

Microcerculus tæniatus, Salv.
Thryothorus paucimaculatus, Sharpe.
Chamæpelia buckleyi, Scl. et Salv.
Penelope ortoni, Salv.

De l'autre côté, nos voyageurs n'ont pas retrouvé toutes les espèces fournies par M. Fraser de Babahoyo et de Pallatanga; 50 espèces manquent de la première de ces localités et 34 de la dernière, dans les collections de MM. Stolzmann et Siemiradzki.

La collection de M. Stolzmann est déposée au Musée de Varsovie, et celle de son compagnon au Musée Berlepsch.

Comme nos voyageurs ont continué leurs recherches à Cayandeled, et dans plusieurs autres localités voisines, nous espérons de recevoir encore un bon nombre d'espèces supplémentaires pour cette faune. Nous retardons donc la publication de nos remarques générales sur la faune ornithologique de l'Ecuadeur occidental, jusqu'à ce que nos voyageurs auront terminé leur exploration dans cette contrée intéressante.

TURDIDÆ.

1. CATHARUS DRYAS (Gould).

Trois mâles et deux femelles de Chimbo, recueillis en octobre, novembre et décembre 1882.

Bec, pattes et un anneau autour des yeux d'un orangé vif; iris brun rougeâtre. La couleur jaune des parties inférieures du corps très intense. Ces oiseaux ressemblent en tout dans leur coloration à ceux du Pérou septentrional (Huambo), recueillis en avril et mars, mais le jaune du dessous est un peu plus vif, et la taille moins forte. Longueur de l'aile 87–89 mm., tandis que ceux du Pérou l'ont 97–98 mm.; queue 60–65, tandis que les péruviens l'ont de 75–77 mm.

2. TURDUS SWAINSONI, Cab.

Un mâle recueilli par Siemiradzki à Chimbo, en décembre, semblable en tout aux oiseaux péruviens, tandis que les oiseaux de l'Ecuadeur oriental (Sarayacu, Buckley), dans le Musée Berlepsch, paraissent plutôt appartenir au *T. ustulatus*, Nutt.

3. TURDUS IGNOBILIS MACULIROSTRIS, Berlepsch MS.

Une paire, recueillie en septembre 1882, à Chimbo. Iris brun-clair.

> T. ignobili, *ex Bogota, maxime affinis, sed differt rostri dimidio apicali flavo; coloribus præcipue in pectore pallidioribus, dorso cum alis et cauda extus olivascentioribus, tectricibus subcaudalibus magis brunneo maculatis.*

Les oiseaux de la collection de M. Sclater, recueillis dans l'Ecuadeur occidental, par Fraser, présentent la même couleur du bec que nos oiseaux de Chimbo; cette particularité parait donc être constante, et présenter un caractère distinctif. Nous n'avons pas vu d'oiseaux de l'Ecuadeur oriental, mais les oiseaux de Bogota (vrai *ignobilis*) ont toujours le bec noir en entier.

Les oiseaux de Pérou central (Amable-Maria) et du Pérou septentrional (Chirimoto et Huambo) ont constamment le bec foncé en entier, une plaque d'un blanc pur assez volumineuse au-dessous de la gorge, semblable à celle du *T. leucomelas* du Brésil, mais ce qui ne parait pas être constant, car il y a une femelle de Huambo, qui n'a pas de plaque pareille; la couleur des parties supérieures du corps est dans ces oiseaux moins olive et distinctement plus foncée que dans les oiseaux de l'Ecuadeur occidental.

Le *T. maculirostris* ressemble par la coloration du bec au *T. grayi* de l'Amérique centrale, et peut être considéré le remplaçant de cette espèce dans l'Ecuadeur occidental.

4. Turdus obsoletus, Lawr.

Un mâle recueilli à Chimbo le 14 octobre 1882, par Stolzmann. Iris brun grisâtre foncé. Espèce nouvelle pour la faune de ce pays, connue de Costa Rica et de Panama.

5. Mimus longicaudatus, Tsch.

Un exemplaire, sans indication de sexe, recueilli par Siemiradzki à Guayaquil, le 8 août. Iris brun rougeâtre. Longueur totale 270 mm.

L'oiseau de Guayaquil ressemble plutôt à ceux de Tumbez et de Chepen, qu'aux oiseaux de Lima. Il a la bande noire auriculaire également large, la poitrine et les flancs également squamulés de blanc, mais il s'en distingue par la nuance du fond des parties supérieures du corps plus cendré. Cet individu se distingue de tous les oiseaux péruviens avec lesquels je l'ai comparé par l'aile beaucoup plus courte, elle n'a que 110 mm. tandis que les péruviens l'ont de 120–127 mm. Longueur totale des péruviens est de 280–308 mm.

Troglodytidæ.

6. Campylorhynchus balteatus, Baird.

Un mâle de Yaguachi, recueilli par Siemiradzki en décembre. Les types de Baird venaient de Guayaquil et de Piura (Pérou).

7. Cyphorhinus phæocephalus, Scl. P. Z. S. 1860, p. 291 (décrit d'Esmeraldas).

Trois exemplaires recueillis par Stolzmann à Chimbo, en septembre et novembre, s'accordent en tout avec les descriptions de MM. Sclater et Sharpe. Iris brun foncé.

8. Microcerculus tæniatus, Salv. Ibis, 1881, p. 130, tab. iii. f. 2.

Deux mâles de Chimbo, recueillis en décembre. Iris brun. Ces oiseaux s'accordent en tout avec la description faite d'après les oiseaux de l'Ecuadeur occidental.

9. Henicorhina leucophrys (Tsch.).

Trois mâles, une femelle et un jeune de Chimbo, recueillis en septembre, novembre et décembre. Iris brun.

Ces oiseaux s'accordent parfaitement avec ceux du Pérou septentrional (Tambillo) et ne s'en distinguent que par la nuance du dos un peu moins rougeâtre. La femelle du Pérou central (Sillapata) a le bec moins long que tous les oiseaux de Tambillo et de Chimbo, et se distingue de tous par le manque complet de raies noirâtres à travers les rémiges. Dans la description de Tschudi ces raies noires sont indiquées. Ses types provenaient du Pérou nord oriental; si donc cette différence sera constante dans les oiseaux du Pérou central, on pourrait séparer cette forme comme une race locale.

10. THRYOPHILUS NIGRICAPILLUS, Scl. P. Z. S. 1860, p. 87 (décrit de Nanegal).

Six mâles, deux femelles et un jeune de Chimbo, recueillis en septembre, octobre et novembre. Iris brun roussâtre.

Tous ces exemplaires ont la gorge et le milieu de la poitrine d'un blanc pur sans raies; il parait donc que le *T. schotti*, Baird, d'Antioquia et de Rio Truando serait une forme bien distincte.

11. THRYOTHORUS MYSTACALIS, Scl. P. Z. S. 1860, p. 67 (décrit de Pallatanga).

Trois mâles de Chimbo, recueillis par Stolzmann en novembre et décembre 1882. Iris brun.

Un oiseau d'Antioquia du Musée Berlepsch, diffère légèrement.

12. THRYOTHORUS PAUCIMACULATUS, Sharpe, Cat. B. Brit. Mus. vi. p. 238 (décrit des montagnes Balzar).

Mâle et femelle recueillis par Stolzmann à Guayaquil en août 1882, s'accordent en tout à la description. Iris brun rougeâtre foncé.

13. TROGLODYTES FURVUS ALBICANS, Berlepsch MS.

Un exemplaire, sans indication de sexe, recueilli par Siemiradzki à Guayaquil en septembre. Niche dans les fissures du sol salé (*Siemiradzki*).

> T. furvo *proximus, differt gula et abdomine medio pure albis (fere niveis); corpore supra pallidiore, magis griseo-brunneo et lateribus rufescentioribus.*

Cette forme du *T. furvus* est peut-être plus distincte que toutes les autres races qu'on a déjà établi. Elle est reconnaissable au premier coup d'œil par le blanc de neige sur la gorge et le milieu de l'abdomen, présentant un contraste choquant avec le roussâtre foncé des flancs et l'isabelle du haut de la poitrine, tandis que dans toutes les autres races, tout le dessous est d'un blanc ou d'un isabelle uniforme, à flancs brunâtres. Le *T. albicans* n'a pas de raies transversales sur les flancs, propres au *T. striatulus* de Bogota, et sur le dos les raies sont à peine indiquées, également comme chez le *T. audax* du Pérou. Les sous-caudales ne sont que marquées d'une petite tache brune, au lieu d'être rayées. La tête, le dos antérieur et les couvertures supérieures des ailes sont d'un brun grisâtre, croupion d'un brun plus roussâtre. Iris brun.

Le mâle recueilli par Stolzmann à Chimbo en novembre ne diffère du précédent que par la couleur un peu plus roussâtre au dos, et les flancs, le milieu de l'abdomen lavé légèrement d'isabelle. Ces oiseaux ont une taille beaucoup moins forte que les *T. audax*. Longueur totale selon Siemiradzki 120, vol 170 mm.

	T. albicans.		*T. audax.*	
	♂.	Sexe non indiqué.	♂.	♀.
	mm.	mm.	mm.	mm.
Longueur de l'aile pliée......	50	51	55	49
" queue	36	35	45	40
" bec	17	18	19	20

La couleur du dessous est bien différente dans les oiseaux péruviens, en ce que tout le dessous est d'un isabelle assez fort et uniforme, moins distingué du brunâtre des flancs.

Nos oiseaux se distinguent aussi de ceux de Cayenne par une taille moins forte et le manque des raies foncées au dos; mais s'en approchent plus par la coloration du dessous.

14. Troglodytes solstitialis, Scl. P. Z. S. 1858, p. 550 (décrit de Matos et Pinipi).

Un mâle recueilli par Siemiradzki à Cayandeled en décembre.

Plus petit que les oiseaux péruviens (aile 45 mm. longue, tandis que les péruviens l'ont 50–53 mm.) et toutes les couleurs en général plus rousses.

Mniotiltidæ.

15. Parula pitiayumi (Vieill.).

Une paire tuée par Stolzmann à Chimbo, en octobre et décembre.

16. Geothlypis semiflava, Scl. P. Z. S. 1860, p. 273 (d'après les oiseaux de Babahoyo).

Quatre mâles adultes recueillis à Chimbo en septembre, octobre et novembre.

Un mâle de septembre (coll. Berlepsch) possède une ligne jaune dans le noir des freins, commençant du bec et s'étendant jusqu'au dessus des yeux.

17. Basileuterus fraseri, Scl. MS.

B. chrysogaster, Scl., nec Tsch.

Quatre mâles et une femelle, recueillis par Stolzmann à Chimbo et à Guayaquil en août et en novembre. Iris brun foncé.

18. Basileuterus semicervinus, Scl. P. Z. S. 1860, p. 84 (décrit de Nanegal).

Un exemplaire sans indication de sexe recueilli à Chimbo par Siemiradzki.

19. Setophaga verticalis (Lafr. et d'Orb.).

Deux mâles de Chimbo, recueillis en novembre. Iris brun foncé.

20. Setophaga ruticilla (L.).

Deux mâles recueillis par Stolzmann à Chimbo en septembre. Iris brun foncé.

Vireonidæ.

21. Vireosylvia chivi griseobarbata, Berl.

Deux mâles et une femelle de Chimbo, recueillis en décembre. Iris fauve.

V. chivi *simillima, sed regione mystacali griseâ, et pectore griseo lavato vel flammulato distinguenda.*

Cette forme de la *V. chivi* est à peine séparable, mais nos exemplaires ont des moustaches grisâtres sur les côtés de la gorge, moins prononcées et moins étendues que celles du *V. calidris*. Le milieu du haut de la poitrine est aussi flammulé de grisâtre sur un fond blanc, qu'on ne voit pas sur les *chivi* de différentes localités dans la collection Berlepsch. En outre les oiseaux de Chimbo ressemblent à ceux de Venezuela, de la Guyane et de Bahia. Les couleurs sont très vives ; les sous-alaires et les sous-caudales d'un jaune souffré vif, côtés du corps d'un jaune olivâtre. La calotte d'un gris ardoisé bleuâtre, très pur, les bordures noires bien prononcées. La bande sourcilière d'un blanc pur depuis le bec jusqu'à la nuque. Le vert olive des parties supérieures un peu terne ou grisâtre.

22. Hylophilus minor, Stolzm. MS.[1]

H. *supra læte flavido-olivaceus, uropygio flavidiore, pileo obscuriore et cinerascente; subtus et in genis albidus, abdomine medio pure albo, lateribus pectoris, crisso subcaudalibusque flavis; remigibus intus nigricantibus, extus flavo-olivaceis, primariis externis albo marginatis; cauda flavido-olivacea.*

♂. D'un olive jaunâtre en dessus, à croupion plus jaunâtre, le sommet de la tête distinctement plus obscur à base des plumes cendrée, plus ou moins visible à travers l'extrémité des plumes; lores blanches ; côtés de la tête d'un cendré perlé clair ; en dessous la couleur générale blanche, enduite légèrement de grisâtre sur la gorge et la poitrine, d'un blanc pur au milieu de l'abdomen, les côtés de la poitrine jaunes, ceux de l'abdomen d'un jaune moins pur, sous-caudales d'un jaune pâle. Tectrices alaires olives, bordées de jaunâtre; rémiges noirâtres à barbe externe de la couleur du dos, excepté dans cinq primaires externes, où cette barbe est bordée finement de blanc ; sous-alaires et le bord interne des rémiges sont d'un jaune pâle. Queue olive-jaunâtre. Bec corné ; pattes d'un corné brunâtre ; iris brun très foncé.

Oiseaux sans indication de sexe, probablement femelles, se distinguent du précédent par les lores d'un cendré pâle, le jaune des côtés de la poitrine moins pur, et le blanc de l'abdomen moins pur.

♂. Longueur de l'aile 54, queue 40, bec 15, tarse 17 mm.

Un mâle adulte et deux oiseaux sans indication de sexe recueillis par Stolzmann à Chimbo, en septembre et octobre.

23. Cyclorhis virenticeps, Scl. P. Z. S. 1860, p. 274 (décrit de Babahoyo).

Un mâle de Yaguachi du 21 décembre, trois femelles de Guayaquil d'août et de septembre, semblables en tout à ceux de Tumbez et de Paucal. Iris jaune pâle et orangé.

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[1] C'est le *Hylophilus* —— ? mentionné par M. Sclater de Babahoyo (P. Z. S. 1860, p. 273) et réuni plus tard par le même auteur (Ibis, 1881, p. 303) au *H. aurantiifrons*, Lawr., qui est tout à fait différent.

HIRUNDINIDÆ.

24. ATTICORA CYANOLEUCA (V.).

Un mâle recueilli par Siemiradzki à Chimbo en novembre.

Cet oiseau s'accorde en tout avec un oiseau de Bogota, dans la collection Berlepsch, mais il a la queue plus courte et le blanc plus pur en dessous.

25. ATTICORA TIBIALIS (Cass.).

Trois mâles recueillis par Stolzmann à Chimbo en décembre. Iris presque noir.

26. STELGIDOPTERYX UROPYGIALIS (Lawr.).

Une femelle tuée par Siemiradzki à Chimbo en octorbe.

Identique avec l'oiseau de Bogota, si ce n'est que la couleur rousse de la gorge et le brunâtre de la poitrine et des côtés sont un peu plus intenses.

CŒREBIDÆ.

27. DACNIS EGREGIA ÆQUATORIALIS, Berlepsch, Journ. f. Orn. 1873, p. 69.

A D. egregia *e Columbia differt: ♂ colore corporis cæruleo multo magis viridescentiore; ♀ colore gulæ grisescente nec olivaceo-viridi, et capite cærulescentiore.*

Une paire recueillie par Stolzmann à Chimbo en novembre. Iris jaune.

28. CHLOROPHANES SPIZA EXSUL, Berl. MS.

Cinq mâles et deux femelles de Chimbo, recueillis en septembre, octobre et novembre. Iris brun rougeâtre.

C. spizæ *similis, sed minor, et colore corporis minime cæruleo tincto.*

Obs. C. spizæ *e Venezuela quoad colores simillima.*

Cette race a la couleur verte du corps sans nuance bleuâtre, tout à fait comme les oiseaux de Venezuela de la collection Berlepsch. Les deux oiseaux de Sarayacu (Ecuadeur or.) de la collection Berlepsch ont le reflet bleuâtre en dessus et en dessous bien prononcé. La race exsul est plus petite que toutes les autres races de cette espèce, surtout le bec dans les oiseaux de Chimbo est plus court et plus mince qu'ordinairement.

29. CŒREBA CÆRULEA (L.).

Un mâle adulte recueilli par Stolzmann à Chimbo le 7 novembre 1882, semblable par sa coloration aux oiseaux du Pérou.

30. CERTHIOLA MEXICANA, Scl.

Mâle adulte et jeune femelle de Chimbo, recueillis par Siemiradzki en octobre et novembre. Iris brun.

S'accordent avec les oiseaux de Bogota, et plus encore avec ceux de l'Amérique centrale.

TANAGRIDÆ.

31. **PROCNIAS CÆRULEA OCCIDENTALIS**, Scl.

Deux mâles adultes, deux femelles et un mâle très jeune tués en novembre et décembre. Iris brun foncé. Le mâle a l'aile 87, queue 58 mm.; la femelle aile 80–85·5, queue 51–52 mm. Ces dimensions s'accordent avec celles des oiseaux de la Nouvelle Grenade.

32. **EUPHONIA XANTHOGASTRA**, Sundev.

Deux mâles et trois femelles de Chimbo, recueillis en septembre, novembre et décembre. Iris brun foncé.

Le mâle est identique en tout aux oiseaux de Sarayacu (Ecuadeur or.), les femelles s'accordent avec celles de Bogota. Les mâles du Pérou central (Monterico, Ropaybamba) ont la nuance orangée roussâtre du milieu de l'abdomen un peu moins intense, la femelle a aussi le roussâtre plus faible; ces oiseaux péruviens ont distinctement le bec plus court que ceux de l'Ecuadeur.

33. **EUPHONIA HYPOXANTHA**, Stolzm. MS.

E. crassirostri *valde affinis, sed pileo toto usque ad nucham flavo; corpore supra purpurascentiore; colore flavo capitis et corporis infra puriore et pallidiore.*

Le mâle de cette forme se distingue au premier coup d'œil de l'*E. crassirostris* de Bogota par la grande extension du jaune au sommet de la tête jusqu'à la nuque; le jaune de cette plaque, ainsi que celui du dessous du corps, est en général plus clair et plus pur; l'éclat du dessus beaucoup plus violet, tandis qu'il est plus bleu dans l'espèce citée. Bec robuste, noir; pattes d'un plombé noirâtre; iris brun foncé.

Femelle semblable à celle de l'*E. crassirostris*. Les jeunes mâles ressemblent en tout à la femelle; en changeant leur robe ils commencent par la tête, où le front devient longuement jaune uniforme; les lores et le tour des yeux noirs; puis les plumes jaunes commencent à se montrer sur les vertex, et les noires sur le reste de la tête, tandis qu'il n'y a encore aucune plume d'adulte sur le reste du corps. Les oiseaux de Paucal, de la collection de M. Raimondi, présentent la même particularité.

Le bec de cette forme est un peu moins robuste que dans l'oiseau cité.

♂. Longueur de l'aile 62–64, queue 39, bec de la commissure 14, tarse 15·7 mm.

♀. Longueur de l'aile 67, queue 70, bec de la commissure 13·5, tarse 15 mm.

Trois mâles adultes, une femelle et un jeune mâle de Chimbo, recueillis en octobre, novembre et décembre.

34. **CALLISTE AURULENTA** (Lafr.).

Un mâle de Cayandeled, tué par Stolzmann en décembre, semblable en tout aux oiseaux de la Nouvelle Grenade. Iris brun foncé.

35. CALLISTE GYROLOIDES (Lafr.).

Plusieurs oiseaux recueillis à Chimbo depuis le mois d'août jusqu'en novembre. Iris brun foncé.

36. CALLISTE CYANOPYGIA, Scl. MS.

Une paire de Chimbo, recueillie en septembre et décembre. Iris noir.

C. *capite toto cum gula uropygioque cæruleo-thalassinis; dorso, loris, mento pectoreque nigerrimis; abdomine sapphirino cyaneo, ventre medio, crisso subcaudalibusque seladineo-virescentibus; alis caudaque nigris, tectricibus alarum minimis et majorum marginibus thalassinis, mediis aureo-flavis; remigibus rectricibusque glauco marginatis.*

Forme voisine nord-occidentale de la *C. cyaneicollis*, Lafr. (de la Bolivie et du Pérou méridional et central) et de la *C. cæruleocephala*, Sw. (de l'Ecuadeur oriental et du Pérou septentrional), mais parfaitement distincte et reconnaissable au premier coup d'œil. M. Sclater les a provisoirement distingué dans sa collèction et nous avons vu une riche série, déposée chez M. Verreaux à Paris, qui prouve que les caractères sont constants et que l'oiseau mérite à être distingué.

♂ *ad.* Les lores, tout du bec et des yeux, le dos supérieur, et la poitrine sont d'un noir intense velouté; la tête avec la gorge et le cou antérieur, le dos inférieur et le croupion sont d'un bleu clair tirant un peu au séladon, et légèrement au violâtre dans d'autres directions de la lumière; l'abdomen est d'un bleu saphiré assez foncé à disque noir dans les plumes; milieu du ventre, région anale et les sous-caudales d'un vert séladon; ailes noires, à petites tectrices le long de l'avant bras d'un bleu analogue à celui de la tête; les médianes d'un jaune doré verdâtre, formant une large bande à travers de l'aile; les grandes tectrices et les scapulaires bordées de bleu; toutes les rémiges bordées à l'extérieur dé séladon; sous-alaires noirâtres, bordées de bleu. Queue noire à rectrices bordées finement de bleu séladon. Bec et pattes noires; iris brun foncé.

Femelle semblable au mâle, mais à couleurs moins pures.

♂. Longueur de l'aile 68, queue 46 mm.
♀. „ „ 65, „ 47 „

Obs. Distincte des deux formes citées par la coloration des tectrices alaires, qui ne sont d'un doré straminé que sur les médianes, par le croupion non doré mais bleu, et par la couleur beaucoup plus claire sur l'abdomen; de la *C. cæruleocephala* elle se distingue en outre par la gorge concolore au reste de la tête.

37. TANAGRA CANA, Sws.

Deux oiseaux adultes et deux femelles recueillis par Siemiradzki à Guayaquil et à Chimbo, en août, octobre et novembre, identiques aux oiseaux de Venezuela.

38. TANAGRA PALMARUM VIOLILAVATA, Stolzm.

Une paire recueillie par Stolzmann à Chimbo en octobre. Iris brun foncé.

Ces oiseaux se distinguent de ceux de Bogota, de Venezuela et de la Guyane par une teinte violâtre beaucoup plus forte sur les parties supérieures du corps ; la tête du mâle enduite aussi de cette nuance assez forte sur la nuque, dans la femelle beaucoup plus fortement en commençant du front, de sorte que cette nuance verte de pomme, caractéristique à l'espèce, est beaucoup plus faible ; le miroir alaire a aussi une teinte violâtre, tandis qu'elle est olivâtre chez la *T. palmarum melanoptera* ; les grandes tectrices alaires lavées de bleu ; le bec distinctement plus long.

♂. Longueur de l'aile 97, queue 72, bec 18, tarse 20 mm.
♀. ,, ,, 88, ,, 70, ,, 17, ,, 19 ,,

39. COMPSOCOMA SUMPTUOSA CYANOPTERA, Cab.

Un mâle de Cayandeled, recueilli par Stolzmann en décembre. Iris brun foncé.

40. RAMPHOCŒLUS ICTERONOTUS, Bp.

Deux mâles recueillis à Chimbo, en septembre et en novembre. Iris brun rougeâtre.

Un mâle d'Antioquia, dans la collection Berlepsch, est plus grand et a le noir du corps brunâtre, tandis que nos oiseaux, ainsi que celui du Palmal ont le noir pur et intense.

41. PYRANGA ÆSTIVA (Gm.).

Trois mâles adultes, une femelle et deux jeunes mâles de Chimbo, recueillis en octobre, novembre et décembre. Iris brun grisâtre.

42. PYRANGA ARDENS (Tsch.).

Deux mâles de Chimbo, recueillis en septembre et octobre.

Oiseaux identiques à un oiseau de Venezuela de la collection Berlepsch, sans rien de noir sur le devant du front et le devant même du menton, qui se manifeste quelquefois chez les oiseaux du Pérou septentrional (Chirimoto). Ces derniers ont aussi une taille un peu plus forte.

Oiseau de Chimbo. Long. de l'aile 68, queue 55, bec 17, tarse 19 mm.
,, Chirimoto. ,, ,, 74, ,, 60, ,, 16, ,, 19 ,,

43. PHŒNICOTHRAUPIS STOLZMANNI, n. sp.

Ph. *supra fusco-olivaceus, unicolor ; subtus pallidior, abdomine medio latissime subcaudalibusque ochraceo-rufescentibus, gula pallide flavido-ochracea ; alis nigricantibus, tectricibus dorso fere concoloribus, remigibus in pogonio externo flavido-olivaceis ; subalaribus rufescenti-aurantiacis ; cauda olivacea.*

♂ *ad.* D'un olive foncé, unicolore en dessus, sur les ailes et les côtés de la tête ; gorge d'un roussâtre pâle ; une couleur ocreuse tirant sur l'orangé occupe largement le milieu de l'abdomen, tandis que les côtés de la poitrine sont d'un olive moins pur et moins foncé que celui du dos; milieu de la poitrine roussâtre, enduit d'olive; sous-caudales de la couleur du milieu du ventre. Les tectrices alaires sont presque de la couleur du dos; rémiges noirâtres à barbe externe dans les primaires olive jaunâtre, dans les secondaires de la couleur du dos, ainsi que les tertiaires en entier; sous-alaires d'un orangé roussâtre; bord interne des rémiges largement jaunâtre. Queue un peu plus foncée que le dos. Bec brun noirâtre, à dent proéminente sur les bords de la mandibule supérieure; pattes d'un brun foncé; iris gris bordé à l'extérieur de brun.

Mâle moins adulte se distingue du précédent par une bande roussâtre fine à travers de l'aile, formée par les bordures terminales des grandes tectrices; la couleur de la gorge est sale et plus foncée.

Long. de l'aile 83–89, queue 68–71, bec 27, tarse 25 mm.

Forme voisine du *Ph. carmioli*, mais distincte par une autre couleur du dessous, et le manque complet de stries sur la gorge.

Deux mâles recueillis par Stolzmann et une femelle par Siemiradzki à Chimbo, en septembre et décembre.

44. TACHYPHONUS LUCTUOSUS, Lafr. et d'Orb.

Cinq mâles et deux femelles de Chimbo, recueillis en septembre, octobre et novembre.

45. TACHYPHONUS XANTHOPYGIUS, Scl.

Un mâle recueilli par Siemiradzki à Chimbo, en novembre, identique à l'oiseau d'Antioquia de la collection Berlepsch. Iris brun. Espèce trouvée pour la première fois dans ce pays.

46. NEMOSIA GUIRINA, Scl. P. Z. S. 1856, p. 110.

Mâle ad. recueilli par Stolzmann en septembre à Chimbo, plus petit que l'oiseau de la Nouvelle Grenade (coll. Berlepsch), à gorge et les côtés de la tête d'un brun plus pâle, et l'abdomen lavé plus de jaune clair.

Long. de l'aile 64, queue 50, bec 15, tarse 15 mm.

47. CHLOROSPINGUS CANIGULARIS (Lafr.).

Deux mâles et une femelle recueillis par Stolzmann à Chimbo en septembre. Iris brun foncé.

♂. Long. de l'aile 64, queue 52, bec 13·5, tarse 18 mm.
♀. „ „ 55, „ 18, „ 13·5, „ 18 „

48. CHLOROSPINGUS FLAVIGULARIS, Scl.

Quatre mâles, une femelle et un jeune recueillis par Stolzmann à Chimbo, en septembre et octobre. Iris brun grisâtre.

Les oiseaux adultes semblables à ceux de la Nouvelle Grenade; moins adultes ont la plaque gulaire traversée le long du milieu par une raie grisâtre pâle, la poitrine et les flancs beaucoup plus obscurs.

Le jeune en premier plumage diffère des adultes par le manque du jaune sur la gorge, remplacé par le gris brunâtre; l'olive du dessus plus sombre; poitrine et les flancs olives, milieu de l'abdomen gris sale.

49. ARREMON SPECTABILIS, Scl.

Cinq mâles et une femelle de Chimbo, recueillis depuis août jusqu' en décembre.

Ces oiseaux diffèrent très peu de l'*A. erythrorhynchus* de Huambo (Pérou septentrional) ; la différence principale consiste dans le jaune citron intense sur le devant de l'aile, tandis qu'il est orangé chez l'oiseau péruvien, ainsi que dans l'olive jaunâtre vif sur les parties supérieures du corps et des ailes, tandis qu'il est d'un olive brunâtre chez l'oiseau péruvien. La différence est également frappante sur les oiseaux jeunes.

50. ARREMON ABEILLÆI (Less.).

Un mâle adulte et un oiseau sans indication de sexe de Guayaquil, d'août.

51. CARENOCHROUS LEUCOPTERUS (Jard.).

Deux mâles de Cayandeled, recueillis par Stolzmann en décembre.

52. SALTATOR MAGNUS (Gm.).

Trois mâles de Chimbo, de septembre et octobre. Iris terre de Sienne.

Identiques aux oiseaux de Bahia, Guyane britannique, Cayenne, Venezuela et Pérou.

53. SALTATOR ATRIPENNIS, Scl.

Mâle adulte et jeune, recueillis par Siemiradzki à Chimbo en novembre. Iris brun.

54. SALTATOR FLAVIDICOLLIS, Scl. P. Z. S. 1860, p. 274 (type de Babahoyo près de Guayaquil)[1].

S. olivascens, Tacz. P. Z. S. 1877, p. 320, nec Cab.

Un mâle de Yaguachi, recueilli par Siemiradzki en décembre.

Forme voisine au *S. albicollis* (V.), mais jamais à confondre avec cette espèce. L'exemplaire de Yaguachi est identique à ceux de Lechugal, du Musée de Varsovie et de la collection Raimondi.

Notre oiseau se caractérise au premier coup d'œil par un sourcil très large, par l'olive des parties supérieures du corps, comme il paraît, constant pendant toute l'année, car les exemplaires de Lechugal ont été pris en mars, celui de la collection Raimondi en septembre et l'oiseau de Yaguachi en décembre. Les deux derniers ont la nuance vert olive du dessus et le jaunâtre du dessous et du sourcil tout à fait semblables, tandis que les oiseaux de mars ont l'olive moins vert, le jaune du dessous plus faible, mais bien prononcé. M. Sclater dit dans sa description que le *S. flavidicollis* a les parties supérieures du corps cendrées enduites d'olive et la bande sourcilière blanche ; ce qui permet à supposer que son type a été en plumage pâli, voisin de la mue. Du reste notre oiseau s'applique bien à la description.

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[1] MM. Sclater et Salvin, dans un article sur les oiseaux de Bucaramanga (Ibis, 1871, p. 115), prétendent que le *S. flavidicollis* ne serait qu'un jeune de l'*olivascens*, Cab. En tout cas notre oiseau ne peut pas être rapporté à cette espèce.—BERLEPSCH.

Il a toutes les parties supérieures du corps d'un vert olive clair, croupion d'un cendré ardoisé, lavé très peu d'olivâtre, côtés de la tête tirant sur l'ardoisé; sourcil, très large dans toute la longueur de la tête, fort lavé de jaune; tout le dessous blanc, coloré de jaune, surtout sur le cou et la poitrine, il n'y a que quelques taches verdâtres sur les côtés de cette dernière. Rectrices d'un ardoisé foncé. Tectrices alaires et les bordures externes des rémiges secondaires d'une couleur semblable à celle du dos; bordures des primaires plus jaunâtres; sous-alaires d'un blanc lavé légèrement de jaunâtre; pli de l'aile plus jaune. Bec noirâtre, à extrémité jaunâtre.

Long. de l'aile 94, queue 89, bec 20, tarse 25 mm.

55. PITYLUS GROSSUS (L.).

Un oiseau de Chimbo, recueilli par Siemiradzki en septembre. Iris terre de Sienne.

FRINGILLIDÆ.

56. PHEUCTICUS CHRYSOGASTER (Less.).

Mâle ad. et femelle de Chimbo, recueillis par Siemiradzki en septembre.

Ce mâle est plus petit que les oiseaux de Quito et des autres localités de l'Ecuadeur, coll. Berlepsch, surtout le bec est plus court; il a le miroir alaire plus étendu, et une bordure blanche dans la partie terminale des rémiges primaires depuis la 2^e^ jusqu'à la 5^e^. Cette dernière particularité manque aux autres exemplaires de l'Ecuadeur, avec lesquels il a été comparé. C'est constant chez le *Ph. chrysopeplus* de Mexique occidental, mais qui a les dimensions beaucoup plus fortes. Tous les oiseaux péruviens, du Musée de Varsovie et de la collection Raimondi, possèdent ces bordures blanches, le miroir alaire également volumineux et la même taille que les oiseaux de Chimbo.

57. GUIRACA CYANOIDES (Lafr.).

Quatre mâles et deux femelles de Chimbo, recueillis en septembre jusqu'en novembre.

Ces oiseaux s'accordent parfaitement avec ceux de Venezuela, de la collection Berlepsch, et sont bien distincts de ceux de Bahia. Quoique nous n'avons pas vu d'oiseaux typiques de Panama, nous ne doutons pas que nos oiseaux de l'Ecuadeur occidental appartiennent à cette forme de Lafresnaye. Ils se distinguent également des oiseaux de Cayenne et de Yurimaguas (Musée de Varsovie). Outre la forme du bec ils présentent une différence dans le bleu de la tête et du devant de l'aile.

58. GNATHOSPIZA RAIMONDII, Tacz.

L'oiseau recueilli par Siemiradzki aux environs de Guayaquil est une femelle ou un jeune mâle, identique aux oiseaux de Tumbez. Le *G. raimondii* n'était pas encore connu comme habitant de l'Ecuadeur.

59. NEORHYNCHUS NASESUS, Bp.

Un mâle de Guayaquil recueilli par Stolzmann le 24 août. Iris brun foncé.

Espèce trouvée pour la première fois dans l'Ecuadeur.

60. SPERMOPHILA TELASCO, Less.

Sept mâles et cinq femelles recueillis à Guayaquil en août et en septembre.

Tous les mâles paraissent être non adultes, en plumage frais, et se distinguent beaucoup des adultes en noce de Lima, qui ont le bec noir, tandis que tous ceux de Guayaquil et de Tumbez (également non adulte) ont le bec d'un roussâtre clair. Tous ces oiseaux de Guayaquil ont les parties supérieures du corps fort enduites de brun, le dessous lavé d'isabelle clair, la plaque gulaire d'un chocolat clair; il y a cependant quelques-uns sur lesquels le cendré commence à se manifester plus ou moins à l'extérieur des plumes du dos. Les mâles en plumage parfait de Lima, recueillis en décembre sont d'un cendré schistacé foncé en dessus, d'un blanc pur en dessous, à plaque gulaire d'un chocolat foncé; celui de Tumbez en plumage non parfait, mais usé, est recueilli en février.

Cette espèce n'etait pas encore mentionée comme habitant l'Ecuadeur.

61. SPERMOPHILA OPHTHALMICA, Scl. P. Z. S. 1860, p. 276 (décrit de Babahoyo).

Quatre mâles et deux femelles de Guayaquil et Chimbo, d'août et d'octobre.

62. SPERMOPHILA GUTTURALIS OLIVACEA, Stolzm.

Deux mâles et trois femelles de Chimbo, recueillis en septembre, octobre et novembre. Iris brun clair.

Le mâle diffère des oiseaux de Bahia (coll. Berlepsch) par les dimensions plus petites, le bec plus court et plus petit. Les couleurs en général sont les mêmes, mais l'abdomen est d'un jaune plus intense, et la couleur olive du dos est un peu plus vive. La femelle présente aussi les nuances plus intenses en dessus et en dessous que celles de Bahia. Ils présentent aussi la même différence des oiseaux péruviens dans la taille et la nuance du dessous, qui dans la femelle est beaucoup plus jaune; la différence de l'aile est de 8 mm.

63. SPERMOPHILA OBSCURA, Tacz.

Six mâles et deux femelles de Chimbo, recueillis par Stolzmann en novembre et décembre, semblables à l'oiseau typique du Pérou central, mais ils sont en général plus clairs, surtout en dessous, où la partie postérieure est enduite de fauve, le milieu du ventre blanchâtre beaucoup plus largement. L'oiseau péruvien a l'aile longue de 58 mm., ceux de l'Ecuadeur depuis 50-54 mm.

Les jeunes ont les ailes enduites de roussâtre, à barbe externe des grandes tectrices bordée de roux.

L'exemplaire typique est recueilli en mai; la différence de la coloration peut être donc en relation avec la saison.

64. VOLATINIA JACARINA SPLENDENS (Vieill.).

Un mâle en plumage imparfait recueilli par Siemiradzki à Guayaquil en août. C'est la forme de la *jacarina* à sous-alaires noires, tandis qu'elles sont blanches dans les oiseaux typiques du Brésil.

65. CORYPHOSPINGUS CRUENTUS (Less.).

Trois mâles et deux femelles recueillis en avril à Guayaquil.

66. ZONOTRICHIA PILEATA (Bodd.).

Un mâle de Cayandeled, recueilli par Siemiradzki en décembre.

67. EMBERNAGRA STRIATICEPS, Lafr.

Embernagra chrysoma, Scl. P. Z. S. 1860, p. 275.

Trois exemplaires de Chimbo recueillis par Siemiradzki en septembre, octobre et décembre. Iris brun marron.

Il est impossible de distinguer ces oiseaux de la *E. striaticeps* de l'Amérique centrale: un oiseau de Costarica, de la collection Berlepsch, s'en accorde sous tous les rapports. Les oiseaux de l'Ecuadeur ont peut-être le dessous et les côtés un peu plus blanchâtres; les côtés de la tête, la poitrine, et les côtés du corps dans les oiseaux de l'Amérique centrale paraissent être un peu plus lavées de cendré. Les dimensions sont les mêmes. Il est donc impossible de distinguer les oiseaux de l'Ecuadeur, même comme une race locale.

68. CHRYSOMITRIS SIEMIRADZKII, sp. n. (Plate L.)

Ch. *capite toto cum gula aterrimis, dorso saturate olivascenti-flavo, uropygio corporeque subtus pulcherrime aurantio-flavis; rectricibus nigris, in dimidio basali aurantio-flavis; alis nigris, remigibus ad basin flavis, tertiariis albido extus marginatis, tectricibus alarum superioribus minimis totis olivascenti-flavis, majoribus nigris flavo terminatis; subalaribus flavis.*

Fem. *corpore supra flavescenti-olivaceo, uropygio flavescentiore: subtus sordide virescenti-flava, abdomine medio albescentiore; alis caudaque mari similibus, sed coloribus obscurioribus.*

Long. totale 110, aile 56–58·5, queue 32·5–35·5, bec 9–9·7, tarse 12–13·5.

Cette espèce nouvelle se distingue du *Ch. icterica* auquel elle ressemble le plus par une taille beaucoup moins forte, par la couleur jaune verdâtre du dos sans aucune trace de taches foncées, par une belle couleur jaune orangée du croupion et des parties inférieures du corps, le miroir alaire jaune plus étroit etc. Le *Ch. capitalis*, Cab., que le Musée Berlepsch possède de l'Ecuadeur or. (Sarayacu, Buckley), a les dimensions également fortes comme le *Ch. icterica*, et présente les nuances encore plus obscures et plus verdâtres; le dos est d'un vert olive obscur et strié fortement de noirâtre.

La femelle de cette nouvelle espèce se distingue de la femelle de la *Ch. icterica* par ses dimensions beaucoup plus petites. Les parties supérieures du corps sont d'un vert-olive plus jaunâtre, croupion presque jaune, le dessous du corps d'un jaune sale, sans verdâtre.

Quatres mâles ad. et une femelle de Guayaquil, recueillis par Siemiradzki en août et septembre.

69. SYCALIS FLAVEOLA (L.).

Un mâle adulte de Yaguachi, recueilli par Siemiradzki le 20 décembre. Identique aux oiseaux péruviens, et s'accordant avec l'oiseau de Bogota de la collection Berlepsch. Les oiseaux de Bahia et de Rio Janeiro sont peut-être un peu moins forts à stries dorsales un peu plus prononcées; ces différences sont cependant si petites qu'elles ne suffisent pas même pour constituer une race locale.

Cette espèce n'est pas encore mentionée comme provenant de l'Ecuadeur.

ICTERIDÆ.

70. CASSICUS FLAVICRISSUS, Scl. et Salv.

Un mâle de Yaguachi, recueilli par Stolzmann en décembre, identique aux oiseaux de Tumbez. Iris bleu clair.

71. CASSICUS UROPYGIALIS, Lafr.

Une femelle de Chimbo, recueillie par Stolzmann en octobre. Iris d'un bleu pâle.

72. CASSICUS PREVOSTI (Less.).

Trois mâles de Chimbo, recueillis en septembre et décembre. Iris blanchâtre. Les oiseaux de l'Ecuadeur et ceux du Pérou paraissent avoir le bec moins long et plus jaune que ceux de Costarica et du Mexique, qui l'ont d'un jaune verdâtre.

73. ICTERUS MESOMELAS (Wagl.).

Un mâle adulte de Chimbo, recueilli par Siemiradzki en décembre.

Ce mâle a la barbe externe des rémiges tertiaires bordée largement d'un jaune clair; et s'accorde par cette particularité, ainsi que par plusieurs autres détails avec les oiseaux de Guatemala et du Mexique, tandis qu'un mâle de Costarica et un autre de Bogota (dans la collection Berlepsch) ont les tertiaires sans bordures, et sont plus grands. Les oiseaux péruviens ont également les rémiges tertiaires bordées de jaunâtre. Il est donc étonnant de retrouver le vrai *I. mesomelas* à Chimbo et au Pérou, tandis qu'à Costarica et Bogota il y a la forme voisine *I. salvini*, Cass.

74. STURNELLA BELLICOSA, De Filip.

Deux mâles, dont un adulte et l'autre jeune de Guayaquil, recueillis par Siemiradzki en août.

TYRANNIDÆ.

75. SAYORNIS NIGRICANS (Sws.).

Un mâle de Chimbo, recueilli par Stolzmann en novembre.

76. Fluvicola atripennis, Scl.

Deux mâles et une femelle recueillis à Guayaquil et Chimbo en août et septembre. Iris terre de Sienne.

77. Mecocerculus calopterus, Scl.

Un mâle de Chimbo, recueilli par Stolzmann en octobre.

78. Platyrhynchus albigularis, Scl.

Un mâle et deux femelles de Chimbo, d'octobre et novembre; une femelle a une huppe orangée très developpée.

79. Todirostrum sclateri, Cab. et Hein.

Deux femelles de Guayaquil d'août, et une de Chimbo de novembre. Iris blanc jaunâtre. Espèce nouvelle pour la faune de l'Ecuadeur.

La femelle de Chimbo a toute la gorge blanchâtre, tandis que chez celle de Guayaquil la partie inférieure de la gorge est lavée d'un jaune pâle et le blanc est restreint au menton. Le *T. sclateri* est décrit dans 'Mus. Heineanum,' ii. p. 50, d'après une femelle péruvienne. Les oiseaux de Chimbo ainsi que celui de Tumbez s'accordent parfaitement avec cette description. Cette espèce se distingue du *T. cinereum* par la gorge et les tectrices nasales blanchâtres, au lieu d'être d'un jaune pur. Il paraît aussi que l'aile et la queue sont un peu plus courtes; en outre il n'y a pas de différence.

80. Lophotriccus[1] squamicristatus (Lafr.).

Quatre mâles adultes et deux femelles de Chimbo, d'octobre, novembre et décembre. La jeune femelle n'a presque aucune huppe; les plumes du sommet de la tête sont à peine allongées et d'un brun roussâtre uniforme. Il paraît qu'un oiseau pareil a servi à la description de l'*Orchilus pileatus* de Tschudi.

81. Serphophaga cinerea (Strickl.).

Une jeune femelle recueillie par Siemiradzki à Chimbo en octobre.

82. Mionectes oleagineus, Cab.

Une femelle recueillie par Stolzmann à Chimbo, en novembre, a la couleur du dessous semblable au *M. assimilis*, Scl., mais à gorge et le dessous du corps d'un olive plus pur et plus vif que chez l'*oleagineus* typique; le bec un peu moins long.

83. Leptopogon superciliaris transandinus, Stolzm.

Deux mâles et deux femelles de Chimbo, pris en octobre et novembre. Iris brun foncé.

Ces oiseaux se distinguent des péruviens par une taille beaucoup moins forte, le bec un peu plus petit, le sommet de la tête d'un ardoisé plus foncé.

♂. Long. de l'aile 68, queue 59, bec 17, tarse 16 mm.
♂. ,, ,, 64, ,, 57, ,, 17, ,, 16 ,,
♀. ,, ,, 58, ,, 52, ,, 16, ,, 15 ,,

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[1] *Lophotriccus*, nov. gen., Berlepsch. λόφος = huppe; τρίκκος, nom propre. Les espèces: 1. *L. spicifer* (Lafr.); 2. *L. squamicristatus* (Lafr.).

84. Capsiempis flaveola (Licht.).

Deux paires de Chimbo, d'octobre, novembre et décembre. Iris brun clair.

Identiques aux oiseaux de Bahia, d'où l'espèce est décrite; il paraît seulement que la bande sourcilière et les bandes transalaires sont plus mêlées de blanchâtre; les petites tectrices nasales sont presque blanches, tandis qu'elles sont jaunes dans l'oiseau de Bahia; la couleur olive du dos est aussi un peu plus claire et le bec un peu plus long.

Les dimensions sont les mêmes que celles de l'oiseau de Bahia.

Espèce nouvelle pour la faune de l'Ecuadeur.

85. Myiopatis[1] tumbezana (Tacz.).

Deux oiseaux adultes de Guayaquil recueillis en août et septembre.

Identiques aux oiseaux typiques de Tumbez. L'oiseau de Pacasmayo est un peu plus fort, et a une nuance plus brunâtre au dos, et les bordures des tectrices alaires plus rousses et plus larges. Espèce nouvelle pour la faune de l'Ecuadeur.

86. Phyllomyias griseiceps (Scl. et. Salv.), P. Z. S. 1870, p. 842 (décrit de Pallatanga et de Babahoyo).

Trois oiseaux de Chimbo, recueillis en octobre.

Le *Tyranniscus griseiceps*, Scl. et Salv., est voisin des *Phyllomyias brevirostris* (Spix), *Ph. incanescens* (Wied), *Ph. griseocapilla*, Scl.—(*Berlepsch.*)

87. Ornithion sclateri, n. sp.

O. pusillum, Scl., nec Cab. et Hein.

Trois mâles et deux femelles de Guayaquil, Yaguachi et Chimbo, d'août, octobre, novembre et décembre. Iris brun.

Cette espèce était décrite par M. Sclater d'après les exemplaires de Pallatanga, sous le nom indiqué plus haut (P. Z. S. 1860, p. 68); mais en 1859 MM. Cabanis et Heine avaient déjà donné le nom de *M. pusilla* à un oiseau du même genre, mais parfaitement distinct de l'espèce de Pallatanga. On ne peut pas donc employer ce nom à notre oiseau.

M. Sclater, dans les P. Z. S. 1873, p. 577, donne son *E. pusillum* comme synonyme de la *Muscipeta incanescens*, Wied, qui est très distincte, comme l'a remarqué M. Lawrence, après avoir examiné le type du Prince de Wied, dans le musée de Boston. Le Musée Berlepsch possède cette dernière espèce de Bahia.

M. Sclater donne aussi pour synonyme de son *E. pusillum* (l. c.) le *Camptostoma imberbe* (décrite en 1857 du Mexique). C'est certainement une espèce très voisine de l'oiseau de l'Ecuadeur occid.; mais il paraît que ce dernier se distingue dans plusieurs détails.

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[1] Le nom générique doit être changé en *Myiopatis*, car le *Phyllomyias* de Cab. et Hein. a pour type le *Ph. brevirostris* (Spix), à bec dilaté, voisin du *Tyranniscus griseiceps*, Scl. et Salv. *Myiopatis*, Cab. et Hein., a pour type *incanescens*, Cab. et Hein., nec Wied, qui est le même que *Ph. semifusca* Scl.—Berlepsch.

M. Sclater a déjà remarqué que les oiseaux de l'Ecuadeur occid. ont le croupion plus pâle que ceux du Mexique et d'autres localités ; il a attribué cette particularité à l'âge, mais les oiseaux que nous ont fourni nos voyageurs sont adultes, et tous possèdent une bande claire au croupion.

Les oiseaux de Siemiradzki sont plus petits que ceux de Bahia et ont le bec plus long ; ils ont une bande d'un blanc jaunâtre au croupion, et toutes les rectrices largement terminées de la même couleur ; les latérales ont leur barbe externe d'un blanc sale presque en entier. Les oiseaux de Bahia n'ont rien de blanchâtre au croupion et sur la queue.—(*Berlepsch.*)

88. TYRANNISCUS CHRYSOPS (Scl.).

Mâle non adulte recueilli par Stolzmann à Chimbo en septembre.

89. TYRANNISCUS CINEREICEPS, Scl.

Une femelle de Chimbo recueillie par Stolzmann en septembre. Iris blanc.

90. ELAINEA SEMIPAGANA, Scl. P. Z. S. 1861, p. 406 (décrit de l'Ecuadeur occ.).

Deux oiseaux adultes de Guayaquil et de Yaguachi recueillis en août et décembre.

Cet oiseau paraît être bien distinct de l'*E. pagana*. Il est reconnaissable par une teinte grisâtre des parties supérieures du corps ; la huppe est très développée sans presque aucune trace de bordures blanchâtres à la base des plumes cervicales. Il a une taille beaucoup plus forte que la *pagana* de Cayenne, et le bec d'une autre forme, fort comprimé dans sa partie terminale. L'oiseau de Chirimoto, au Pérou septentrional, a une taille aussi forte que l'oiseau de l'Ecuadeur, le bec de la même forme que les oiseaux de Cayenne, et du blanc à la base des plumes cervicales ; il se distingue des oiseaux de Cayenne par une nuance des parties supérieures du corps plus olive et non brunâtre.

	♂ Ecuadeur. mm.	♂ Pérou. mm.	♂ Cayenne. mm.
Long. de l'aile	81	82	72–73
,, queue....	80	81	70
,, bec	16·5	17	15

91. ELAINEA SUBPLACENS, Scl. P. Z. S. 1861, p. 407 (décrit de Pallatanga).

Quatre mâles et deux femelles de Guayaquil et de Chimbo, d'août jusqu'en décembre. Iris brun foncé.

Espèce trés-distincte de l'*E. placens*, Scl., et des autres formes voisines.

Les oiseaux de Lechugal et de Paucal (Pérou) appartiennent aussi à la même forme, et ne présentent aucune différence de ceux de l'Ecuadeur.

92. LEGATUS ALBICOLLIS (Vieill.).

Un mâle recueilli par Stolzmann à Chimbo en novembre.

93. MYIOZETETES CAYENNENSIS (L.).

Une femelle recueillie par Stolzmann à Guayaquil en août. Iris brun foncé.

94. MYIOZETETES GRANADENSIS, Lawr.

Trois mâles recueillis à Chimbo en octobre et novembre. Iris gris clair, ou brun grisâtre.

Ces oiseaux s'accordent avec un exemplaire de Costarica (Mus. Berlepsch) : ils ont l'aile un peu plus courte, l'olive du dos un peu plus obscur, la coloration en général un peu plus intense, les plumes de la huppe moins allongées.

95. RHYNCHOCYCLUS PERUVIANUS, Tacz., subsp. *æquatorialis*.

Une femelle de Guayaquil recueillie par Siemiradzki en août, et une paire de Chimbo prise par Stolzmann en septembre.

La coloration de ces oiseaux s'accorde en tout avec celle de l'oiseau typique de Ropaybamba, au Pérou central : ils ont cependant le vert olivâtre du dos distinctement plus clair, les bordures aux rémiges également plus claires, et le jaune du milieu du ventre beaucoup plus largement disposé. La différence principale est dans une taille beaucoup moins forte, et dans la forme du bec, qui dans l'oiseau typique s'amincit graduellement en avançant vers l'extrémité de sorte que la ligne latérale de chacun de ses côtés est presque droite dans toute sa longueur, tandis que dans ces oiseaux de Chimbo le bec est beaucoup plus élargi dans les deux tiers de sa longueur, où la ligne latérale forme une courbe assez forte.

Les oiseaux de Lechugal (nord-ouest du Pérou) sont tout à fait identiques à ces oiseaux de Chimbo ; mais comme ils sont en plumage usé, les nuances sont un peu autres, et les dimensions plus petites.

Les oiseaux de Huambo (nord-est Pérou) sont intermédiaires entre ces deux formes ; les dimensions sont intermédiaires, la forme du bec également intermédiaire, les détails de la coloration comme ceux des oiseaux de l'Ecuadeur.

	Pérou centr.	Huambo.	Chimbo.		Lechugal.	
	♂	♂	♂	♀	♂	♀
Longueur de l'aile	74	71	65	63	62	60
„ queue ..	61	60	60	56	55	56
„ bec	18	18	18·5	18·5	18·5	18·5
Largeur du bec vis-à-vis la naissance des narines	5	5·5	6	—	6	—

96. MYIODYNASTES BAIRDI (Gambel).

M. atrifrons, Scl. P. Z. S. 1857, p. 274 (décrit de Guayaquil).

Mâle adulte recueilli par Siemiradzki à Guayaquil en juillet.

Semblable au mâle de Chepen (Pérou), il a seulement les dimensions un peu plus petites, le bec un peu plus gros, et les couleurs du corps un peu plus ternes, surtout sur la poitrine, où il y a un mélange de brun grisâtre.—(*Berlepsch.*)

97. **Megarhynchus pitangua chrysogaster** (Scl.).

M. chrysogaster, Scl. P. Z. S. 1860, p. 287 et 295 (décrit de Babahoyo et d'Esmeraldas).

Deux mâles et une femelle de Guayaquil et de Chimbo, d'août et décembre. Iris brun.

Les oiseaux de l'Ecuadeur occidental, comme l'a remarqué M. Sclater (l. c.), diffèrent des *pitangua* des autres localités par le jaune du dessous plus vif et plus intense. Il paraît aussi que les mâles ont toujours le milieu de la huppe interne d'un roux orangé ou marron comme la femelle, tandis que le mâle adulte du vrai *pitangua* l'a toujours d'un jaune clair. Les oiseaux de Veragua, et peut-être des autres localités de l'Amérique centrale sont un peu intermédiaires entre ces deux formes.—(*Berlepsch.*)

98. **Muscivora occidentalis**, Scl. P. Z. S. 1860, p. 282 (décrit de Babahoyo).

Une paire de Guayaquil, recueillie en août et décembre.

99. **Myiobius erythrurus**, Cab.

Deux oiseaux adultes et un jeune de Chimbo, recueillis en septembre et novembre. Iris brun.

Ces oiseaux s'accordent avec un oiseau adulte de la Guyane britannique d'où venaient les types du Prof. Cabanis ; mais dans les oiseaux de Chimbo la région frontale et sourcilière est plus lavée de roussâtre. Les oiseaux de Sarayacu (Ecuad. or.) et de Costarica présentent la même coloration que ceux de Chimbo. L'oiseau du Pérou central (Monterico) est encore plus roussâtre au front que ceux de Chimbo ; l'oiseau de Cayenne n'a rien de cette nuance.

100. **Myiobius stellatus**, Cab. Journ. f. Orn. 1872, p. 158 (décrit de l'Ecuadeur).

Plusieurs exemplaires de Chimbo de septembre et novembre. Iris brun.

> M. ornato *simillimus, sed multo minor, caudæ dimidio basali imprimis flavo, dein rufo, dimidio apicali nigricante; remigibus secundariis et tertiariis rufescenti-olivaceo extus marginatis; abdomine et uropygio intensius citrino-flavis; pectore magis flavescenti-olivaceo.*

Cette forme est très voisine au *M. ornatus* de Bogota, mais elle est reconnaissable par ses dimensions beaucoup moins fortes et par la coloration de la queue, un peu intermédiaire entre celle du *M. ornatus* et du *M. phœnicurus*. Les autres détails sont indiqués dans la diagnose.

M. stellatus: Long. de l'aile 55·5–56·5, queue 38–39, bec 10·5–11·5, tarse 17 mm.

M. ornatus: Long. de l'aile 65·5, queue 45·5, bec 12, tarse 15·5.

Jeune oiseau a le noir de la tête moins intense, la huppe interne peu développée et roussâtre, couleur jaune du croupion et du dessous moins intense et moins pure.

101. **Myiobius crypterythrus**, Scl. P. Z. S. 1860, p. 464 (décrit de Pallantanga et de Babahoyo).

Un mâle et une femelle de Guayaquil et de Chimbo, d'août et d'octobre.

Bonne espèce dont le mâle a la huppe interne d'un cannelle vif, et la femelle d'un roussâtre ou jaune pâle; parfaitement distincte du *M. nævius*, et malgré cela omise dans le Nomencl. Av. Neotrop.

102. **Pyrocephalus rubineus** (Bodd.).

Deux mâles adultes de Guayaquil, recueillis par Siemiradzki en juillet, et un jeune mâle de Chimbo, pris en novembre. Iris brun.

C'est la même petite forme qui se trouve dans tout le Pérou septentrional. Il paraît cependant que l'oiseau occidental se distingue par la barbe externe des rectrices latérales, qui est presque blanchâtre, tandis qu'elle est tout-à-fait brune chez l'oiseau oriental. Le nom de *rubineus* s'applique à l'oiseau de l'Amazone; la forme occidentale a peut-être besoin d'une distinction comme race locale.

103. **Empidochanes griseipectus** (Lawr.) (décrit de l'île Puna).

Trois mâles et trois femelles de Chimbo, recueillis en octobre, novembre et décembre. Iris brun.

C'est plutôt un *Empidochanes* qu'un *Empidonax*, comme le pense M. Lawrence.

104. **Empidonax acadicus** (Gm.).

Empidonax griseigularis, Lawr. Ann. Lyc. New York, viii. p. 471.

Une femelle de Chimbo, recueillie par Stolzmann en septembre.

Je ne crois pas qu'on puisse séparer l'*E. griseigularis* de l'*E. acadicus* de l'Amérique septentrionale, et je suis d'avis que le premier s'applique au jeune âge de l'*acadicus*, qui ne se trouverait dans cette localité que pendant l'hiver. M. Lawrence a décrit son espèce comme plus petite, à parties supérieures plus vertes, l'abdomen plus jaune.—(*Berlepsch.*)

105. **Contopus richardsoni**, Sw.

Un mâle de Chimbo recueilli par Stolzmann en septembre.

L'exemplaire est en plumage fort usé, il s'accorde en tout avec les exemplaires de *C. richardsoni*, mais il n'a rien d'olivâtre au dos.

106. **Contopus ardesiacus** (Lafr.).

Une jeune femelle en plumage usé, recueillie par Stolzmann à Chimbo en septembre.

107. **Contopus punensis**, Lawr. Ann. N. H. New York, ix. (1869), p. 237 (décrit de l'île Puna).

Trois mâles et une femelle de Guayaquil, d'août et de septembre. Iris terre de Sienne. M. Lawrence a décrit un jeune.

108. **Myiarchus phæocephalus**, Scl. P. Z. S. 1860, p. 281 (décrit de Babahoyo).

Un oiseau de Guayaquil, pris par Siemiradzki en septembre. Iris terre de Sienne.

109. **Myiarchus nigriceps**, Scl. P. Z. S. 1860, p. 68 (décrit de Pallatanga).

Deux femelles de Chimbo, de septembre et octobre. Iris brun clair.

110. **Tyrannus melancholicus**, Vieill.

Une femelle de Chimbo, prise par Siemiradzki en décembre. Iris brun.

PIPRIDÆ.

111. **Chiromachæris manacus** (L.).

Cinq mâles, deux femelles ad. et deux jeunes mâles de Chimbo, recueillis en août, octobre, novembre et décembre. Iris brun.

Les mâles diffèrent un peu de ceux de Cayenne et de l'île Trinité; ils ont la couleur blanche du cou et du dessous beaucoup plus pure, et plus étendue au cou postérieur et sur l'abdomen; la bande noire au dos plus étroite; le cendré du croupion plus clair et plus bleuâtre; queue un peu plus courte. Comme la variabilité individuelle est grande dans cette espèce, il faudrait des matériaux plus nombreux pour pouvoir se décider si cet oiseau occidental mérite à être distingué comme race locale.

COTINGIDÆ.

112. **Tityra albitorques**, Du Bus.

Une femelle de Guayaquil, recueillie par Stolzmann en août.

113. **Pachyrhamphus albogriseus**, Scl. ?

Un mâle ad. et un jeune mâle de Chimbo, recueillis en octobre et novembre.

L'oiseau de cette localité s'accorde presque en entier avec celui de Guajango (Pérou sept.), mais il est plus petit, et a le cendré du dos un peu plus clair. Je n'ai pas pu encore comparer les oiseaux typiques de Bogota, mais un mâle adulte de ma collection, qui vient de Venezuela ou de Sta. Martha, diffère beaucoup de ceux de Chimbo et de Guajango: il est beaucoup plus grand, à bec plus gros, les rectrices pourvues de taches blanches sensiblement plus longues.

Les dimensions données par M. Sclater paraissent se rapporter à la même grande race que mon oiseau de Sta. Martha.—(*Berlepsch.*)

114. **Pachyrhamphus spodiurus**, Scl. P. Z. S. 1860, p. 279 (décrit de Babahoyo).

Une paire recueillie par Stolzmann, à Chimbo, en septembre.

115. CEPHALOPTERUS PENDULIGER, Scl.

Cinq mâles et deux femelles de Chimbo, recueillis en septembre.

L'appendice jugulaire est long dans les uns de 320, dans les autres 220, et 180 mm.

DENDROCOLAPTIDÆ.

116. FURNARIUS CINNAMOMEUS (Less.).

F. longirostris, Pelz. Sitzb. Acad. Wien, 1856, p. 158.

Un mâle ad. de Yaguachi, recueilli par Siemiradzki en décembre.

M. de Pelzeln (Ibis, 1881) n'accepte pas le nom de Lesson, à cause d'un très mauvaise description; je crois cependant qu'il n'y a pas de doute qu'elle s'applique à notre oiseau, car le type venait de Guayaquil. La description de M. Pelzeln était prise d'un oiseau d'une provenance inconnue.—(*Berlepsch.*)

117. SYNALLAXIS STICTOTHORAX, Scl. (décrit de Guayaquil).

Deux mâles, une femelle et un oiseau sans indication de sexe pris à Guayaquil en août.

118. SYNALLAXIS PUDICA, Scl.

Trois mâles ad., un jeune mâle et une femelle de Chimbo, recueillis en août, septembre, octobre et novembre. Iris terre de Sienne.

De la comparaison avec un oiseau de Bogota (coll. Berlepsch) je trouve que l'oiseau de Chimbo est un peu plus petit, le cendré de la poitrine plus clair, le milieu de l'abdomen plus blanchâtre et la gorge blanchâtre tachetée de cendré, tandis qu'elle est d'un cendré presque noirâtre dans la *S. pudica* vraie.

M. Sclater, qui a fondé son espèce sur les oiseaux de Bogota, prétend que les oiseaux de l'Ecuadeur occ. n'en sont pas séparables. Il me paraît cependant qu'ils sont vraiment intermédiaires entre sa *pudica* de Bogota et sa *hypospodia* de Bahia.—(*Berlepsch.*)

119. SYNALLAXIS FRUTICICOLA, Tacz.

Un oiseau sans indication de sexe, recueilli par Stolzmann, à Cayandeled en décembre. Identique aux oiseaux de Tambillo et de Cutervo (Pérou sept.). Diffère du *S. elegantior*, Scl., par la queue d'un marron plus obscur, les rectrices latérales non teintes d'olive au bout, la bande sourcilière postoculaire d'un roux clair au lieu de cendré, et par une taille moins forte. Cet individu diffère des péruviens, cités plus haut, par les plumes du milieu du dos antérieur lavées un peu de roux.

120. SYNALLAXIS ERYTHROPS, Scl.

Un mâle de Cayandeled, recueilli par Stolzmann en décembre. Iris brun.

121. AUTOMOLUS ASSIMILIS, Stolzm. MS.

A. *supra ex olivaceo brunneus, plumis pilei fuscis stria mediana fulva; uropygio posteriore tectricibusque caudæ superioribus obscure cinnamomeis; lateribus capitis olivaceo-fuscis fulvo striatis; subtus pallide olivaceus, gula ochracea fusco squamulata; pectore striis tenuissimis fulvis, abdomine medio subochraceo induto, subcaudalibus rufo lavatis; alis extus rufo-brunneis, intus vivide aurantiaco-rufis; cauda rubro-castanea.*

♂ *ad.* D'un brun olivâtre foncé en dessus, à sommet de la tête beaucoup plus obscur, varié de baguettes d'un fauve blanchâtre dans toutes les plumes et d'une nuance olive autour de ces baguettes, beaucoup plus clair que les bordures latérales de ces plumes; la partie postérieure du croupion et les suscaudales sont d'un roux marron foncé; côtés de la tête olives striés de fauve, une rangée de petites stries pareilles forme un sourcil postoculaire; le dessous du corps est d'un olive brunâtre beaucoup plus clair qu'en dessus, à gorge ocreuse, squamulée finement d'olive foncé; la poitrine parsemée de baguettes fauves et enduite en grande partie d'une légère nuance ocreuse surtout au milieu ainsi qu'au milieu de l'abdomen; souscaudales colorées à l'extrémité de roux. Ailes d'un brun roussâtre à l'extérieur, à barbe interne des rémiges brun noirâtre, bordée intérieurement de roux clair, sousalaires d'un beau roux orangé. Queue d'un marron rougeâtre. Bec et pattes bruns. Iris brun foncé.

La femelle ne diffère que par moins de stries sur la poitrine, et le milieu de l'abdomen à nuance un peu plus fauve.

♂.	Longueur de l'aile	87,	queue	65,	bec	24,	tarse	23 mm.
♀.	„	83,	„	64,	„	25,	„	21 „

Forme voisine de l'*A. stictoptilus* (Cab.), de Pérou central, mais distincte parfaitement par le manque de stries au dos, beaucoup moins de stries sur la poitrine et point sur l'abdomen; une nuance plus olive sur ce dernier; la queue d'un roux plus rouge; le bec beaucoup moins long et plus foncé.

Une paire de Chimbo, recueillie par Stolzmann en novembre.

122. PHILYDOR ERYTHRONOTUS, Scl.

Deux mâles et un oiseau sans indication de sexe de Chimbo recueillis en septembre et octobre. Iris brun foncé.

Semblables au *Ph. pyrrhodes*, Cab., de Cayenne, mais parfaitement distincts par la nuque, plus ou moins largement, rousse, séparant nettement la couleur brune olivâtre foncée du sommet de la tête de celle du dos, qui est aussi plus ou moins enduit de roux. Le mâle en plumage frais a tout le dessous d'une couleur plus pâle, et tout-à-fait différente de ceux de Cayenne. L'oiseau sans indication de sexe a le roux beaucoup plus fort au dos, le dessous et le sourcil d'un roux uniforme, semblable à celui des oiseaux de Cayenne. Le bec beaucoup plus court que celui du *Ph. pyrrhodes*.

Espèce nouvelle pour la faune de l'Ecuadeur.

123. ANABAZENOPS TEMPORALIS, Scl. P. Z. S. 1859, p. 141 (décrit de Pallatanga).

Quatre mâles recueillis à Chimbo en septembre, octobre et novembre.

Il me paraît qu'il est impossible à séparer génériquement le *Philydor striaticollis* de l'*Anabazenops temporalis* et *A. variegaticeps*.—(*Berlepsch.*)

124. XENOPS LITTORALIS, Scl. P. Z. S. 1861, p. 379 (décrit de Esmeraldas).

Deux mâles ad., un oiseau ad., et un jeune mâle de Chimbo, recueillis en septembre, octobre et novembre.

Le *X. littoralis* ne se distingue du vrai *X. genibarbis*, Ill. (décrit de Cameta, Amazone inf.), que par le dessous et dessus du corps plus olivâtre (moins roussâtre), la gorge plus jaunâtre, les ailes et la queue plus longues et le bec plus gros. Les oiseaux de Venezuela sont très semblables aux oiseaux de Chimbo, mais sont encore plus grands avec le bec plus long et le plumage un peu plus roussâtre en dessus et en dessous ; le *X. approximans*, Pelz., de l'Amazone supérieur est aussi grand que les oiseaux de Venezuela, mais il a le dessous du corps plutôt d'un gris roussâtre.—(*Berlepsch.*)

125. XENOPS RUTILUS, Licht.

Un mâle ad. de Guayaquil, recueilli par Siemiradzki en septembre.

Cet exemplaire s'accorde presque en entier avec les oiseaux de Bahia (localité originaire de l'espèce). La queue a tout-à-fait la même coloration, et les parties supérieures du corps présentent les mêmes couleurs ; seulement le dessous du corps est beaucoup plus roussâtre, la gorge d'un blanc jaunâtre, le reste du corps inférieur d'un brun roussâtre avec des flammèches d'un blanc jaunâtre.

126. SITTASOMUS AMAZONUS, Lafr.

Une femelle de Chimbo, recueillie par Siemiradzki en octobre.

Semblable en tout aux deux mâles de Lechugal (Pérou sept.) et Palmal (Ecuador mérid.) mais plus petite. Les oiseaux du Pérou central (Amable-Maria, Monterico, Ropaybamba) sont encore d'une taille beaucoup plus forte, d'un roux cannelle au croupion, sur les ailes et la queue beaucoup plus foncé, et l'olive du dessous et de la tête beaucoup plus obscur, sans nuance jaunâtre. Le mâle de Huambo (Pérou sept.) est de la même taille que les oiseaux du Pérou central, d'une couleur semblable à ces derniers, mais moins foncée.

	Chimbo.	Palmal.	Perou central.		Huambo.
	♀	♂	♂	♀	♂
	mm.	mm.	mm.	mm.	mm.
Long. de l'aile	66	77	87–89	77	89
,, queue ..	66	85	92	76	86
,, bec	18	20	21	21	21

M. Pelzeln a déjà remarqué que les femelles de ce genre sont beaucoup plus petites que les mâles.

S. olivaceus, de Wied, ne paraît être qu'un synonyme de l'*erithacus*, Licht. Un oiseau de Bahia (coll. Berlepsch), qui doit appartenir à la forme de Wied, est plus voisin des oiseaux du Brésil du sud (vrai *erithacus*) qu'à ceux de l'Amazone.

127. GLYPHORHYNCHUS CUNEATUS CASTELNAUDI (Des Murs).

Un oiseau de Chimbo, recueilli par Stolzmann en octobre.

Semblable au *G. castelnaudi* de l'Ecuadeur or., mais un peu moins fort et à gorge plus pâle.

128. MARGARORNIS BRUNNESCENS, Scl.

Une femelle de Chimbo, prise par Stolzmann en octobre. Iris brun foncé. Je ne possède pas l'oiseau typique de Bogota pour la comparaison, mais un d'Antioquia et un autre de Veragua sont plus grands que celui de Chimbo, et ont le dos d'un brun plus olivâtre, les gouttes abdominales plus grosses et la queue plus brunâtre.—(*Berlepsch.*)

129. DENDROCINCLA ATRIROSTRIS (Lafr.).

Deux oiseaux adultes sans indication de sexe et une femelle de Chimbo, recueillis en octobre, novembre et décembre. Iris gris très clair.

Je ne possède pas des oiseaux de Bolivie pour comparer ; les oiseaux de Chimbo se distinguent de ceux de Veragua par les ailes et le bec un peu plus longues, la coloration du corps en général plus claire, surtout sur l'abdomen, qui est plus roussâtre.—(*Berlepsch.*)

130. DENDRORNIS ERYTHROPYGIA ÆQUATORIALIS, Berl. MS.

Quatre mâles et une femelle de Chimbo, recueillis en septembre, octobre et novembre. Iris brun ; pattes d'un gris d'acier.

Ces exemplaires s'accordent en général avec ceux de Guatemala ; ils sont cependant un peu plus olivâtres en dessus, et en dessous, surtout au sommet de la tête, où les stries claires sont moins visibles. Les ailes sont aussi un peu plus longues. Les oiseaux typiques venaient du Mexique.—(*Berlepsch.*)

131. PICOLAPTES SOULEYETI (Des Murs).

Une femelle de Guayaquil, recueillie par Siemiradzki en août.

132. XIPHORHYNCHUS THORACICUS, Scl. P. Z. S. 1860, p. 277 (décrit de Babahoyo).

Un mâle ad. de Chimbo, pris par Siemiradzki en septembre.

Selon ma manière de voir, cette forme occidentale est suffisamment distincte du *X. trochilirostris* (Licht.) du Bresil, et du *X. procurvoides* (Lafr.) de la Guyane, pour constituer une espèce particulière.—(*Berlepsch.*)

FORMICARIIDÆ.

133. THAMNOPHILUS TRANSANDEANUS, Scl. P. Z. S. 1855, p. 18 (décrit de Guayaquil).

Un mâle et deux femelles de Chimbo, recueillis en septembre. Iris rouge orangé.

134. THAMNOPHILUS IMMACULATUS, Lafr.

Six mâles et deux femelles de Chimbo, recueillis en septembre, novembre et décembre.

Identiques aux oiseaux de Bogota, ils sont de la même taille, mais les mâles de Chimbo ont le bec distinctement plus long que le mâle de la localité citée du Musée de Varsovie. Parties nues des côtés de la tête d'un gris bleuâtre, plus claires sur la région auriculaire; cette dernière presque blanche dans la femelle; iris terre de Sienne brûlé.

135. THAMNOPHILUS NÆVIUS (Gm.).

Deux mâles et quatre femelles de Chimbo, recueillis en septembre, octobre et novembre. Iris brun.

Paraissent être identiques avec les oiseaux de la Guyane britannique et de Cayenne. Le type de Latham venait de Cayenne.

136. DYSITHAMNUS SEMICINEREUS, Scl.

Deux mâles recueillis à Chimbo, en septembre et décembre. Iris gris.

Ailes et queue plus courtes que dans les oiseaux de Bogota; ils ont le dos un peu plus lavé d'ardoisé, les rectrices externes presque sans bordure blanche à l'extrémité; en outre ils sont identiques. Un oiseau de Guatemala (coll. Berlepsch) s'accorde avec les oiseaux de Chimbo, dans les dimensions et les couleurs. Les oiseaux du Pérou central (Monterico, Amable-Maria) sont beaucoup plus grands (l'aile est longue dans les mâles de 64–66 mm., tandis que les oiseaux de Chimbo l'ont de 58–60 mm.); ils ont le cendré beaucoup plus largement disposé sur la poitrine, et le dos plus olive. Les oiseaux du Pérou septentrional (Huambo, Cococho) sont d'une taille aussi forte que ceux du Pérou central, mais ils ont aussi peu de cendré sur la poitrine que ceux de Chimbo.

137. MYRMOTHERULA SURINAMENSIS (Gm.).

Trois mâles et deux femelles de Chimbo, recueillis en septembre et novembre. Iris brun foncé.

Le mâle paraît être identique à l'oiseau de la Guyane britannique (coll. Berlepsch), les dimensions sont cependant un peu plus fortes, et le dessin noir sur le fond blanc est moins nettement prononcé.

138. MYRMOTHERULA MENETRIESI, d'Orb.

Un mâle et deux femelles recueillis à Chimbo en octobre et décembre.

C'est la *M. menetriesi* de MM. Sclater et Salvin, et d'autres auteurs, mais il me paraît être bien probable que l'oiseau de la

Bolivie, décrit par D'Orbigny, est réellement distinct. On pourrait peut-être appliquer à l'oiseau de Chimbo le nom de *schisticolor*, Lawr., donné aux oiseaux de Costarica ; mais en comparant le mâle de Chimbo avec un mâle de Veragua et un autre de Bogota, j'ai remarqué que le premier a les ailes et la queue plus courtes, et qu'il est d'une couleur plus intense et plus noirâtre en dessus. Le noir de la gorge et de la poitrine est aussi plus pur, plus intense et plus prolongé sur le milieu de l'abdomen.—(*Berlepsch.*)

Les deux mâles du Pérou central ont le noir jugulaire moins prolongé sur la poitrine et plus rétréci que les oiseaux de Veragua et de Bogota. Les mâles du Pérou septentrional (Huambo) ont le noir fort, prolongé sur le milieu de l'abdomen ; le cendré dans ces oiseaux est en général plus foncé que dans tous les oiseaux cités plus haut, surtout au sommet de la tête, qui paraît comme ondulé de noirâtre.

139. Formicivora consobrina, Scl. P. Z. S. 1860, p. 279 (décrit de Babahoyo).

Un mâle et deux femelles de Chimbo recueillis en novembre. Iris brun foncé.

140. Rhamphocænus cinereiventris, Scl.

Deux paires de Chimbo recueillis en novembre et septembre.

En comparant les exemplaires avec un oiseau de Sarayacu, Ecuadeur or. (coll. Berlepsch), je trouve que l'oiseau de Chimbo a les côtés de la tête d'un roux plus clair, le sommet de la tête d'un brun olivâtre au lieu de brun roussâtre intense, le dos et les ailes olivâtres au lieu de roussâtres, et une ligne brunâtre derrière l'œil, qui manque tout-à-fait à l'oiseau de Sarayacu.—(*Berlepsch.*)

141. Rhamphocænus rufiventris, Bp.

Quatre oiseaux des deux sexes recueillis par Stolzmnn à Chimbo en décembre.

Ailes, tarse et surtout le bec plus longs que chez un oiseau de Guatemala (coll. Berlepsch), gorge moins mélangée de noirâtre ; poitrine et côtés moins roussâtres, sous-alaires plus roussâtres, dos plus clair et plus roussâtre. Au contraire un oiseau du Mexique (Musée de Varsovie) a les dimensions un peu plus fortes ; le bec et tous les détails de la coloration semblables en tout, excepté la gorge, qui est plus maculée de noir que dans nos oiseaux de Chimbo. Nos oiseaux s'accordent le mieux avec ceux de Sta Martha.

Espèce nouvelle pour la faune de l'Ecuadeur.

142. Cercomacra tyrannina, Scl.

Un mâle adulte pris par Siemiradzki à Chimbo en novembre, et un jeune mâle de la même localité recueilli par Stolzmann en novembre, à queue fort usée et le plumage assez pâli, qui paraît appartenir à la même espèce.

L'oiseau adulte s'accorde bien avec l'oiseau de Guatemala (coll. Berlepsch) ; les couleurs sont seulement un peu plus claires et moins olivâtres au croupion et les bords des rémiges.

143. PYRIGLENA PICEA, Cab.

Un mâle ad. de Chimbo, recueilli par Siemiradzki en novembre. Iris rouge ocreux.

144. MYRMECIZA EXSUL, Scl.

Quatre mâles et trois femelles de Chimbo, recueillis en septembre, octobre et novembre. Iris brun foncé. Dans le mâle la partie nue de la tête d'un bleu cobalt foncé, dans la femelle gris bleuâtre.

Les oiseaux typiques de l'espèce viennent de Panama, je n'ai pas eu encore l'occasion de les examiner, mais M. Sclater dit sur les oiseaux d'Esmeraldas (Ecuadeur occid.) qu'ils ne diffèrent des oiseaux typiques que par le noir plus ardoisé sur la tête et la poitrine. Dans la diagnose il est dit: "capite toto undique et corpore infra ad medium ventrem nigris," tandis que ces parties dans les oiseaux de Chimbo sont d'un ardoisé foncé.—(*Berlepsch.*)

145. HYPOCNEMIS NÆVIOIDES (Lafr.).

Une femelle recueillie par Stolzmann à Chimbo.

TROCHILIDÆ.

146. PHAETHORNIS YARAQUI (Bourc.).

Cinq mâles ad., deux femelles et quatre jeunes, recueillis à Chimbo en septembre, octobre et novembre.

Les exemplaires sont un peu plus petits, surtout l'aile plus courte, et ont le vert du dessus et du dessous du corps un peu plus bleuâtre que ceux de Quito du Musée Berlepsch.

147. PHAETHORNIS STRIIGULARIS, Gould.

Trois mâles de Chimbo, recueillis en décembre.

Ces oiseaux ont le dessous du corps un peu plus roussâtre que celui de l'oiseau de Bogota (Musée Berlepsch). Un exemplaire de Porto Cabello, Venezuela (Mus. Berlepsch), a le dessous tout-à-fait comme celui de l'oiseau de Chimbo. Ce dernier a les parties supérieures du corps un peu plus obscures, les ailes et la queue un peu plus courtes que les oiseaux de Bogota et de Venezuela; en outre ils s'accordent dans tous les détails.

148. LAMPORNIS IRIDESCENS, Gould.

Deux mâles ad., trois jeunes mâles, trois femelles et un jeune sans indication de sexe de Guayaquil, recueilli en août.

La femelle adulte paraît être distincte de la femelle du *L. violicauda*, par le manque ou très peu de nuance violet amethyste sur les rectrices externes.

149. FLORISUGA MELLIVORA (L.).

Sept mâles de Chimbo, recueillis en septembre, octobre et novembre.

Identiques en tout aux oiseaux de Cayenne et du Pérou septentrional; il se distinguent cependant de ceux de Cayenne par le bec plus comprimé dans la partie basale, tandis qu'il y est élargi dans les oiseaux cités. Il est étonnant que nos voyageurs n'ont pas recueilli aucune femelle, également comme Stolzmann ne l'a pas fourni du Pérou septentrional, et M. Jelski n'a aussi fourni que des mâles de Cayenne.

150. Heliothrix barroti (Bourc.).

Quatre mâles, quatre femelles et quatre jeunes mâles dans les différentes livrées, recueillis à Chimbo en septembre, octobre, novembre et décembre.

Les mâles adultes ont la plaque violette étendue jusqu' à l'occiput. La nuance violette varie légèrement : dans deux individus elle est un peu rougeâtre, dans les autres un peu plus bleuâtre et plus terne. Les mâles adultes ont la queue assez courte ; un jeune mâle qui n'a encore rien de bleu sur la tête, mais un peu sur les oreilles l'a aussi très courte ; deux mâles dans le plumage semblable à celui des femelles, avec peu de maculature sur la poitrine, ont la queue aussi longue que ces dernières.

L'espèce est décrite de Carthagène ; si l'oiseau de cette localité peut être distingué de celui de l'Écuadeur occid. le dernier devrait porter le nom de *purpureiceps*, Gould, basé sur un oiseau de Popayan. Les oiseaux de Chimbo s'accordent avec un mâle de Costarica du Musée Berlepsch.

151. Thalurania hypochlora, Gould, P. Z. S. 1870, p. 104 (décrit de Citado, Ecuador).

Sept mâles ad., deux mâles en plumage imparfait et neuf femelles de Chimbo, recueillis en septembre, octobre, novembre et décembre.

152. Heliodoxa jamesoni (Bourc.).

Trois mâles, dont deux en mue, recueillis à Chimbo en novembre et décembre.

153. Heliomaster albicrissa, Gould, P. Z. S. 1871, p. 504 (décrit de Citado).

Cinq mâles ad., trois jeunes mâles, six femelles et un jeune de Guayaquil et de Chimbo, recueillis en août, septembre et novembre.

154. Lampropygia wilsoni (Del. et Bourc.).

Un jeune mâle en mue de Cayandeled, recueilli par Siemiradzki en décembre.

155. Cynanthus cyanurus cœlestis (Gould).

Deux mâles adultes, recueillis à Cayandeled en décembre.

156. Gouldia conversi æquatorialis, Berl. MS.

Quatre mâles ad., deux jeunes mâles et trois femelles de Chimbo, recueillis en octobre et novembre.

Les oiseaux de Chimbo se distinguent de ceux de Bogota en ce que les plumules allongées du milieu de la poitrine sont d'un beau bleu, plus ou moins intense, tandis que dans les oiseaux de la localité citée ils sont d'un vert bleuâtre ou doré; ils ont aussi les ailes un peu plus courtes, et les tectrices supérieures de la queue moyennes plus teintes d'un cuivreux violâtre; en outre il n'y a plus de différence.

157. MYRMIA MICRURA (Gould).

Quatre mâles ad., 5 mâles jeunes, 5 femelles et un jeune oiseau de Guayaquil, recueillis en août.

Espèce nouvelle pour la faune de l'Ecuadeur, rare dans les collections. Gould, dans sa première description, lui a donné Pérou pour habitat; puis il a ajouté Pérou ou Bolivie. MM. Sclater et Salvin et M. Elliot l'indiquent de Bolivie, ce qui est probablement une erreur, car l'espèce n'a pas été encore trouvée qu'au Pérou dans les environs de Tumbez (Stolzmann et Jelski), et récemment à Guayaquil.

Mulsant a eu raison pour établir pour cet oiseau un genre nouveau *Myrmia*, intermédiaire entre les genres *Myrtis* et *Acestrura*.

Un des mâles adultes fourni par Stolzmann a la plaque gulaire d'une couleur bien différente de celle des autres; le rouge violet ordinaire n'y est que faiblement accentué, et remplacé par le doré tirant sur l'orangé, qui dans certaines directions de la lumière devient uniforme sur toute la surface; les plumes du bord inférieure de la plaque conservent cette nuance dorée dans toutes les directions de la lumière.

158. CHÆTOCERCUS BOMBUS, Gould, P. Z. S. 1870, p. 804 (décrit de Citado).

Trois jeunes mâles et six femelles de Chimbo, recueillis en septembre, octobre et novembre.

159. AGYRTRIA VIRIDICEPS (Gould).

Trois mâles de Chimbo de septembre et octobre.

160. AMAZILIA DUMERILI (Less.).

Sept mâles, deux femelles, trois sans indication de sexe et un jeune de Guayaquil de août, septembre, octobre et novembre.

161. AMAZILIA RIEFFERI JUCUNDA, Heine.

Sept mâles, jeune femelle et un oiseau sans indication de sexe de Chimbo, recueillis en septembre, octobre et novembre.

162. JULIAMYIA FELICIANA (Less.) (décrit de Guayaquil).

Trois mâles ad., quatre mâles jeunes et cinq femelles de Chimbo, de septembre, octobre et novembre.

163. CHLOROSTILBON MELANORHYNCHUS, Gould (décrit de Quito).

Six mâles ad., trois mâles jeunes et deux femelles de Chimbo, de septembre, octobre, novembre et décembre.

Peut-être un peu différents des oiseaux de Quito[1].

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[1] Peut-être les oiseaux de Chimbo sont plus proches du *Ch. atala* (Less.). Je n'ai pas encore vu de mâle adulte.—(*Berlepsch.*)

CYPSELIDÆ.

164. HEMIPROCNE ZONARIS (Shaw).

Deux femelles de Guayaquil et de Chimbo, recueillis en septembre et en décembre.

L'exemplaire de Guayaquil a seulement le collier blanc sur la nuque, tandis que sur la région jugulaire il n'y a que deux plumes blanches; les autres sont seulement bordées légèrement de blanchâtre. C'est une particularité individuelle, car l'oiseau de Chimbo et celui de Lima de la collection Raimondi ont le collier aussi complet que les oiseaux du Brésil.

165. CHÆTURA SCLATERI OCCIDENTALIS.

Un mâle ad., et trois femelles de Chimbo, recueillis en septembre et décembre. Iris brun très foncé. Espèce nouvelle pour la faune de l'Ecuadeur.

Ces oiseaux ont le cendré du croupion et de l'abdomen plus obscur que chez la vraie *Ch. sclateri*, Pelz.; l'aile et la queue sont aussi plus longues. Il nous paraît donc que cet oiseau mérite à être distingué comme race locale.

♂. Long. de l'aile, 112, queue 45 mm. ♀. Long. de l'aile 110–112, queue 45 mm.

Dans la *Ch. sclateri* vraie l'aile est longue de 96, queue 42 mm.

166. CHÆTURA SPINICAUDA (Temm.).

Un oiseau sans indication de sexe, recueilli par Stolzmann à Chimbo en septembre. Iris brun foncé.

Se distingue des oiseaux de Cayenne (Musée de Varsovie) que par une nuance ardoisée, et non grise brunâtre sur la poitrine et l'abdomen, la gorge plus blanche au milieu, et les plumes des lores longuement blanches à la base. Des oiseaux de la Guyane britannique (Musée Berlepsch) il se distingue aussi par la gorge plus blanche, et l'abdomen plus foncé. Comme nous ne possédons qu'un seul exemplaire, il est difficile de juger si cette différence est constante.

Long. de l'aile 105, queue 44 mm. La longueur de l'aile de la femelle de Cayenne est la même.

167. PANYPTILA CAYENNENSIS (Gm.).

Un oiseau adulte de Guayaquil, tué par Siemiradzki en août.

CAPRIMULGIDÆ.

168. NYCTIBIUS JAMAICENSIS (Gm.).

Un mâle de Chimbo, tué par Stolzmann en décembre. Iris presque noir.

169. NYCTIDROMUS ALBICOLLIS (Gm.).

Un jeune mâle de Chimbo, tué par Siemiradzki en novembre. Iris brun d'ombre.

PICIDÆ.

170. PICUMNUS GRANADENSIS, Lafr. ?

Sept mâles, quatres femelles et un jeune de Chimbo et de Yaguachi, recueillis en septembre, octobre, novembre et décembre. Iris brun grisâtre foncé.

Oiseau bien différent de celui de la Nouvelle Grénade (Musée Berlepsch et Musée de Varsovie). Dans les oiseaux de Chimbo l'olive du dos est plus grisâtre, la poitrine jaunâtre sale ou grise lavée de jaune, tandis qu'elle est plus ou moins enduite de brunâtre dans l'oiseau de la Nouvelle Grenade. Le mâle de l'oiseau de l'Ecuadeur a les stries frontales d'un jaune citron pur, tandis qu'elles sont d'un orangé intense ou orangé rougeâtre chez l'oiseau de Bogota ; les points blancs sont aussi un peu plus gros. L'aile est aussi plus longue de 2 mm. dans l'oiseau de l'Ecuadeur.

171. PICUMNUS SCLATERI, Tacz.

Un mâle adulte, quatre femelles adultes, trois femelles jeunes et deux jeunes en premier plumage de Guayaquil, recueillis en août et septembre.

Le mâle adulte diffère de la femelle par les taches frontales blanches à la base, et d'un jaune souffré dans la moitié terminale, ce qui forme une couleur sale indécise à une certaine distance, et n'est distincte nettement que de près ; ces taches frontales sont plus ou moins aigues au bout.

Dans le plumage parfait des deux sexes les taches blanches s'usent sur le cervix et la nuque, ne laissant qu'une fine ligne sur l'extrémité des plumes, tandis qu'elles gardent leur forme arrondie au front.

Les jeunes dans leur premier plumage ont le fond du dos distinctement plus foncé que celui des adultes, des stries blanches fines au lieu de gouttes au sommet de la tête, le blanc du fond de la poitrine moins pur, les raies abdominales moins larges, les bordures des rémiges secondaires olives.

Espèce nouvelle pour la faune de l'Ecuadeur.

172. CAMPEPHILUS SCLATERI (Malh.).

Deux mâles adultes de Chimbo, recueillis en avril et décembre. Iris jaune. Les oiseaux de Palmal (Ecuadeur méridional) et de Lechugal (nord Pérou) de la collection Raimondi ont le croupion beaucoup plus varié de fauve roussâtre que l'oiseau de Chimbo.

173. CHLORONERPES CALLONOTUS, Waterh.

Deux mâles adultes de Yaguachi et trois jeunes mâles de Chimbo, recueillis en octobre, novembre et décembre. Iris brun foncé dans l'adulte, gris foncé dans le jeune.

Les oiseaux du Pérou septentrional (Tumbez, Guadalupa, Morropere) du Musée de Varsovie et de la collection de M. Raimondi, sont d'une taille plus forte que ceux de l'Ecuadeur, et se distinguent constamment par la couleur des côtés de la tête, qui, au lieu d'être d'un brun uniforme sur toute la surface, sont blancs, avec une tache brunâtre auriculaire, commençant derrière et au-dessous de l'œil, et séparant la couleur blanche en deux parties, dont une occupe le bas des côtés du visage, et l'autre commençant à une certaine distance du bord postérieur de l'œil, forme une large bande, renfermée entre la nuque et la tache auriculaire et se confond avec le blanc des côtés du cou. Cette forme peut être distinguée comme une race locale, *Ch. callonotus major*.

Les raies foncées sur le blanc du dessous sont propres, comme il paraît, à l'âge non adulte des deux formes, tandis qu'elles manquent aux adultes. Les jeunes oiseaux de l'Ecuadeur ont les côtés du visage semblables à ceux des adultes péruviens ; la raie cependant postoculaire est blanchâtre au lieu de blanche pure, la tache auriculaire plus étendue, le rouge du dessus moins vif et moins uniforme que dans l'adulte.

174. CHLORONERPES CECILIÆ (Malh.).

Cinq mâles et une femelle de Chimbo, recueillis en septembre, octobre et novembre. Iris brun.

175. CHLORONERPES CANIPILEUS (d'Orb.).

Une femelle de Chimbo, recueillie par Siemiradzki en septembre.

Cet oiseau a les dimensions très petites (ailes 10–5 mm.), la moustache noire très prononcée, sans taches blanchâtres.

176. MELANERPES PUCHERANI (Malh.).

Trois mâles ad. de Yaguachi recueillis en décembre. Iris jaune.

Identiques aux oiseaux de l'Amérique centrale, ils sont seulement un peu plus petits, à l'olive de la poitrine plus grisâtre, le jaune du front plus pâle, la tache blanche postoculaire plus petite, et toutes les nuances un peu plus pâles que l'oiseau de Costarica.

MOMOTIDÆ.

177. MOMOTUS MICROSTEPHANUS, Scl.

Deux femelles de Chimbo recueillies en octobre. Iris rouge de cerise.

En général ces oiseaux s'accordent avec les oiseaux de Bogota, mais peut-être ils sont intermédiaires entre le *M. microstephanus* de Bogota et le *M. lessoni* de l'Amérique centrale ; peut-être que le nom *subrufescens*, Scl., serait correcte.

178. MOMOTUS MARTII (Spix).

Trois mâles de Chimbo, recueillis en septembre, octobre et novembre. Iris terre de Sienne brûlé.

Identiques à l'oiseau du Pérou central ; le vert du dos est plus intense et plus obscur.

ALCEDINIDÆ.

179. CERYLE CABANISI (Tsch.).

Un mâle recueilli par Siemiradzki à Guayaquil.

TROGONIDÆ.

180. TROGON VIRGINALIS, Cab. et Hein. Mus. Hein. iv. p. 173 (décrit de Pallatanga).

Trois mâles ad. et une femelle de Chimbo, recueillis en septembre et octobre. Iris brun foncé.

Forme très proche du *T. collaris* (Vieill.), mais distincte par les raies blanches caudales et la vermiculation blanche des ailes plus distanciées entre elles. Vraiment elle est intermédiaire entre cette espèce et le *T. puella*, Gould, de l'Amérique centrale.

GALBULIDÆ.

181. GALBULA MELANOGENIA, Scl.

Deux mâles, une femelle ad. et une jeune femelle de Chimbo recueillis en septembre et novembre. Iris brun ; pattes d'un jaune sale.

BUCCONIDÆ.

182. MALACOPTILA PANAMENSIS POLIOPSIS (Scl.).

M. poliopsis, Scl. P. Z. S. 1862, p. 86 (décrit d'Esmeraldas).

Un mâle, trois femelles et un jeune de Chimbo, recueillis en septembre et novembre. Iris intérieur largement rouge de brique, à gris extérieurement chez le mâle, rouge cerise dans la femelle. Des deux mâles de Palmal (Ecuador mérid.), un a la moustache blanche comme les femelles de Chimbo, et l'autre l'a ocreuse, peu différente de la couleur de la poitrine.

183. BUCCO RADIATUS, Scl.

Mâle et femelle de Chimbo, recueillis par Stolzmann en novembre et décembre.

Identiques à l'oiseau de Panama de la collection Berlepsch. Iris fauve ocreux, de la même nuance que celle de l'abdomen.

CUCULIDÆ.

184. COCCYZUS AMERICANUS (L.).

Un mâle de Chimbo, recueilli par Stolzmann en septembre. Iris brun foncé.

185. DIPLOPTERUS NÆVIUS (L.).

Un mâle adulte de Chimbo, recueilli par Siemiradzki en septembre. Iris brun très clair. Identique avec les oiseaux de Bahia.

186. PIAYA CAYANA (L.).

Une femelle de Guayaquil recueillie par Siemiradzki en août.

Cet oiseau a les couleurs très pâles, la poitrine d'un gris presque blanchâtre.

187. PIAYA RUTILA (Ill.).

Une paire de Chimbo, recueillie en novembre. Iris rouge cerise.

Couleurs en général plus claires que dans les oiseaux de Cayenne et de Surinam, surtout moins rouge et moins foncée en dessus, plus pâle sur la gorge et la poitrine; nuance de l'abdomen d'un gris plus pur et plus nettement tranchée de celle de la poitrine, région anale et les souscaudales noires. L'oiseau de Palmal (Ecuadeur mérid.) semblable à l'oiseau de Chimbo. Le bec dans ces deux oiseaux est moins long que dans ceux de Cayenne.

RHAMPHASTIDÆ.

188. **RHAMPHASTOS AMBIGUUS**, Sws.

Mâle et deux femelles recueillis à Chimbo en septembre.

Plus petits que l'oiseau de Bogota, à bec beaucoup plus court, du reste semblables.

189. **PTEROGLOSSUS ERYTHROPYGIUS**, Gould.

Une paire de Chimbo, recueillie par Stolzmann en décembre. Iris jaune, gris très foncé derrière et devant la prunelle, ce qui fait qu'elle paraît être oblongue.

CAPITONIDÆ.

190. **CAPITO BOURCIERI** (Lafr.).

Femelle adulte, recueillie à Chimbo par Siemiradzki en novembre.

Iris rouge cerise; bec jaune à base verdâtre; pattes d'un vert olivâtre.

PSITTACIDÆ.

191. **ARA SEVERA** (L.).

Deux mâles et une femelle de Chimbo, recueillis en novembre. Iris à anneau triple, l'extérieur jaune sale, le médiane jaune orangé, l'interne gris.

192. **CONURUS ERYTHROGENYS** (Less.).

Une femelle de Chimbo, prise par Siemiradzki en octobre, et une jeune femelle de Guayaquil prise en août. Iris à anneau double, l'interne gris, l'externe orangé.

193. **BROTOGERYS PYRRHOPTERA** (Lath.).

Un mâle de Guayaquil, recueilli par Siemiradzki en septembre.

194. **CHRYSOTIS FARINOSA** (Bodd.).

Une femelle de Chimbo, recueillie par Stolzmann en octobre. Iris à anneau double, l'externe orangé, l'interne d'un gris très foncé.

195. **PIONUS CHALCOPTERUS** (Fraser).

Trois mâles et quatre femelles, recueillis à Chimbo en octobre et novembre. Iris brun grisâtre foncé ou orangé.

196. PSITTACULA CŒLESTIS (Less.).

Deux mâles adultes, recueillis par Siemiradzki à Guayaquil en août. Iris brun.

STRIGIDÆ.

197. GLAUCIDIUM FEROX (Vieill.).

Un mâle, dans la livrée rousse, de Yaguachi, recueilli par Siemiradzki en décembre. Dans l'estomac des fruits de la *Mangifera indica*.

FALCONIDÆ.

198. BUTEO PENNSYLVANICUS (Wils.).

Deux mâles adultes, et deux jeunes mâles, tués à Chimbo en octobre, novembre et décembre. Iris brun noisette clair. Dans l'estomac des chenilles de lepidoptères, et des morceaux de blattes.

199. BUTEOLA BRACHYURA (Vieill.).

Un mâle tué par Stolzmann à Chimbo le 17 octobre. Iris brun grisâtre foncé. Tout le dessous du corps et le front d'un blanc pur.

200. ICTINIA PLUMBEA (Gm.).

Mâle adulte tué par Siemiradzki à Chimbo en décembre. Iris carminé pâle, pattes orangées. Dans l'estomac des restes de la *Blatta americana*.

201. HYPOTRIORCHIS RUFIGULARIS (Daud.).

Un mâle recueilli par Stolzmann à Chimbo.

202. HARPAGUS BIDENTATUS (Lath.).

Une femelle recueillie par Stolzmann à Chimbo en octobre. Iris rouge pâle.

203. MICRASTUR GUERILLA, Cass.

Un jeune mâle recueilli par Stolzmann à Chimbo, le 6 décembre. Iris brun très foncé.

COLUMBIDÆ.

204. COLUMBA SUBVINACEA, Lawr.

Un mâle adulte de Chimbo, recueilli par Stolzmann en novembre, et un autre mâle fourni par Siemiradzki de la même localité et pris aussi en novembre. Iris rouge framboise avec un cercle blanchâtre très fin autour de la pupille.

Notre oiseau s'accorde parfaitement dans sa coloration avec un oiseau de Costarica (Musée Berlepsch); l'oiseau de Chimbo est seulement plus petit, mais peut-être il n'est pas parfaitement adulte. L'oiseau de Huambo, Pérou septentrional, est intermédiaire entre l'oiseau de Chimbo et la *C. vinacea* de Loretoyacu, Est du Pérou; il est d'une taille intermédiaire, et la coloration est intermédiaire.

205. ZENAIDA MACULATA (Vieill.).

Un mâle de Guayaquil d'août, et une paire de Chimbo, recueillis par Siemiradzki en août et décembre.

Il paraît qu'il n'y a pas de différence entre ces oiseaux et un mâle ad. de Chili, du Musée Berlepsch.

206. PERISTERA CINEREA (Tem.).

Un mâle ad. et un jeune mâle, en livrée de la femelle, recueillis par Siemiradzki à Chimbo, en septembre et décembre. ♂ ad. Iris à anneau interne rouge, l'externe jaune ; pattes rouges ; bec jaune. ♂ jeune. Iris à anneau interne blanc étroit, l'externe d'un rouge cerise.

207. CHAMÆPELIA BUCKLEYI, Scl. et Salv. P. Z. S. 1877, p. 21 (décrit de Sta. Rita, Ecuador).

Un mâle ad. de Yaguachi, recueilli par Stolzmann en décembre, et un jeune de Guayaquil pris par Siemiradzki en août. Iris rouge de sang chez l'adulte, jaune chez le jeune.

208. CHAMÆPELIA CRUZIANA (Knip et Prev.).

Un mâle de Chimbo, pris par Stolzmann en octobre, une femelle de Yaguachi, prise par Siemiradzki en décembre. Semblables en tout aux oiseaux du Pérou central. Iris d'un rouge pâle à l'extérieur, et blanc autour de la pupille.

209. LEPTOPTILA PALLIDA, n. sp.

L. *supra rufo-brunnea, nitore interscapulii violaceo-roseo ; fronte albo, vertice cinereo-cyaneo, cervice nuchaque griseis ; gula media alba, lateribus capitis pallide ochraceis ; collo antico pectoreque roseis, abdomine medio tectricibusque caudæ inferioribus albis ; hypochondriis pallide isabellinis ; remigibus brunneo-nigricantibus, subtus latissime cum subalaribus rufo-cinnamomeis ; cauda supra brunneo-rufa, rectricibus quatuor externis utrinque ante apicem nigricantibus, albo late terminatis ; rostro nigro ; pedibus rubris ; iride pallide flava.*

Cette forme diffère de la *L. rufaxilla*, à laquelle elle paraît être la plus voisine, par la couleur des parties supérieures du corps plus rousse, surtout sur les ailes, le croupion et la queue, l'éclat rosé de la région interscapulaire semblable, mais moins violet, l'olivâtre du dos inférieur et des ailes moins fort, le gris de la nuque moins foncé, l'ocreux des côtés du visage beaucoup plus pâle, le rosé du cou et de la poitrine plus pur et beaucoup moins fort, le blanc du milieu de l'abdomen beaucoup plus largement répandu, l'isabelle des flancs très pâle, bordures latérales des tectrices souscaudales d'un gris moins foncé, le blanc du bout des rectrices beaucoup plus large, les bordures externes des rémiges primaires plus rousses.

De la *L. verreauxi* elle se distingue au premier coup d'œil par les parties supérieures rousses au lieu de gris-olives, la couleur du cou postérieur et de la nuque sans éclat rosé, les côtés du visage tout-à-fait autres, le rosé du devant du cou et de la poitrine beaucoup plus pur, le blanc plus large et plus pur au milieu de l'abdomen.

La partie atténuée de la 1^{re} rémige est plus fine que dans les deux autres formes.

Longueur de l'aile 171, queue 100, bec 20, tarse 30, partie atténuée de la 1^{re} rémige 25 mm.

Un oiseau, sans indication de sexe, recueilli par Stolzmann à Chimbo le 22 octobre.

PENELOPIDÆ.

210. PENELOPE CRISTATA (L.). Scl. et Salv. P. Z. S. 1870, p. 527.

Un mâle et deux femelles de Chimbo, recueillis en novembre.

Sac jugulaire et pattes d'un rouge framboise dans les deux sexes.

♂. Iris orangé, entouré de deux anneaux étroits, l'interne gris clair, l'externe noir; région oculaire et partie caronculée de la gorge dénuées noires terreux. ♀. Iris orangé, entouré d'un anneau noir étroit; région dénuée oculaire ainsi que la partie caronculée de la gorge noires.

Espèce nouvelle pour la faune de l'Ecuadeur.

211. PENELOPE ORTONI, Salv. Ibis 1874, p. 325 (décrit de Mindo, Pichincha).

Deux mâles de Chimbo, recueillis en octobre. Iris brun rougeâtre; sac gulaire orangé, lavé de carmin; pattes d'un rouge carminé.

D'accord complet avec la description citée.

TETRAONIDÆ.

212. ODONTOPHORUS ERYTHROPS, Gould. P. Z. S. 1859, p. 99 (décrit de Pallatanga).

Deux mâles et une femelle recueillis à Chimbo en octobre. Iris brun.

RALLIDÆ.

213. ARAMIDES WOLFI, n. sp.

A. *supra olivaceus, capite fusco-cinereo, auchenio dorsoque anteriore rufescentibus; uropygio latissime caudaque nigris; subtus gula cum collo antico superiore dilute cinerea; jugulo rubro-rufo, pectore abdomineque medio rufis, olivaceo perfusis; hypochondriis olivaceis; ventre medio, crisso, subcaudalibusque nigris; tectricibus alarum remigibusque tertiariis dorso concoloribus; remigibus rufo-cinnamomeis, in pogonio externo secundariorum olivaceo lavatis; subalaribus rufis, nigro fasciatis.*

♂. Parties supérieures du corps olives, à sommet de la tête avec la nuque et le haut du cou postérieur d'un ardoisé pur, plus clair au front, tandis que la partie inférieure du cou et le haut du dos sont d'un roux rougeâtre passant graduellement en olive en arrière; dos inférieur, croupion, queue et les flancs du ventre sont d'un noir intense, cependant les plumes de ce dernier nuancées légèrement de brun ; côtés de la tête d'un cendré ardoisé ; gorge avec le haut du cou antérieur d'un cendré perlé très clair ; région jugulaire d'un roux rougeâtre, passant en une nuance moins rousse sur la poitrine enduite d'olive, et passant complètement dans cette couleur dans certaines directions de la lumière ; le milieu de l'abdomen est aussi roux, tandis que les côtés sont largement olives ; milieu du ventre et les souscaudales noirâtres ; plumes des tibias d'un ardoise noirâtre, mêlé de brunâtre. Rémiges d'un roux cannelle, à extrémité même olive foncée, la barbe externe des secondaires lavée d'olive ; toutes les tectrices et les rémiges tertiaires de la couleur du dos ; sousalaires rousses rayées de noir. Bec vert, à dos de la mandibule supérieure jaune dans la plus grande moitié basale et passant en orangé vers la base ; pattes rouges ; tour de l'œil dénué rouge ; iris rouge brique.

Longueur de l'aile 182, queue 60, tarse 70, doigt médian 60, ongle 12 mm.

Espèce analogue à l'*A. cayennensis*, mais distinctement moins forte, à bec également long mais moins élevé, et la coloration différente dans beaucoup de détails, comme :—le manque de nuance brunâtre sur la nuque ; le roux rougeâtre remplaçant le cendré bleuâtre au cou inférieur ; le roux en dessous réduit au milieu même de l'abdomen et un peu sur la poitrine, tandis qu'il est remplacé par l'olive sur les flancs, les plumes des tibias plus foncées et longuement brunâtres dans leur extrémité ; les bandes noires sousalaires moins foncées ; l'extrémité olive des rémiges plus courte.

Un mâle de Chimbo, tué par Stolzmann le 7 novembre.

Nous dédions cette espèce à Monsieur le Docteur Wolf, savant géologiste et explorateur de l'Ecuadeur.

ARDEIDÆ.

214. TIGRISOMA SALMONI, Scl. et Salv.

Une paire d'oiseaux adultes, recueillie à Chimbo en novembre. Iris d'un gris olivâtre foncé extérieurement, et jaune autour de la pupille.

SCOLOPACIDÆ.

215. ACTITIS MACULARIA (L.).

Une jeune femelle de Chimbo, recueillie par Siemiradzki en novembre.

TINANIDÆ.

216. CRYPTURUS, sp. ?

Un oiseau, comme il paraît non adulte, recueilli par Stolzmann à Chimbo en décembre. Iris gris.

December 4, 1883.

Professor Flower, LL.D., F.R.S., President, in the Chair.

Sir Joseph Fayrer, F.Z.S., exhibited a portion of a Deer's horn apparently gnawed by other Deer, and made remarks upon this subject.

Mr. Sclater exhibited, on the part of Dr. G. Bennett, F.Z.S., four skins of a species of *Drepanornis*, obtained by Mr. Goldie in the vicinity of Port Moresby in Southern New Guinea, and pointed out that the southern form of this bird differed from the northern form, originally discovered by D'Albertis (and described P. Z. S. 1873, p. 560, pl. xlvii.), in the much paler colour of the rump and tail-feathers and in the more olivaceous tinge of the back. Besides this the elongated tufts on each side of the breast were not only tipped with dark purplish blue as in the northern form, but also suffused with this colour upon their outer surfaces.

Mr. E. P. Ramsay (Proc. Linn. Soc. N. S. W. vol. iv. p. 469) had already alluded to these differences, but had only been able to examine specimens.

Mr. Sclater thought that these differences were only of subspecific value, and proposed to indicate their existence by naming the Southern form *Drepanornis albertisi cervinicauda*.

Mr. Sclater remarked that the second species of *Drepanornis*, described by M. Oustalet (Ann. des Sc. Nat. ser. 6. Zool. vol. ix. Art. 5) under the name *Drepanornis bruijnii*, seemed not in any way to resemble the southern form, and was from the northern coast of New Guinea, still more to the east than *D. albertisii*.

Mr. Burton, F.Z.S., exhibited a supposed hybrid between a common hen Pheasant (*Phasianus colchicus*) and a male Blackcock (*Tetrao tetrix*), which had been recently purchased at Leadenhall Market.

The following papers were read:—

1. Notes on some species of Birds of the family *Dicæidæ*. By R. Bowdler Sharpe, F.L.S., F.Z.S., &c., Department of Zoology, British Museum.

[Received October 9, 1883.]

In the course of a revision of the family *Dicæidæ* or Flower-peckers, I have made the following notes on some of the species, which I believe may be of some interest.

The representative of *D. celebicum* in the Sula Islands turns out to be a distinct species, of the same form and style of coloration as that bird, but with the sides of the body entirely olive. I propose for it the name of

1. DICÆUM SULAENSE, sp. n.

Dicæum celebicum, Wall. P.Z.S. 1882, p. 342 (nec Müll. & Schl.).

D. *similis* D. celebico, *sed corporis lateribus olivaceis nec cinereis distinguendum. Long. tot.* 3·66, *culmin.* 0·4, *alæ* 2·05, *caudæ* 1·15, *tarsi* 0·55.

Hab. Sula Islands (*Wallace*). Type in B. M.

I may add that this species is not the same as *D. sanghirense*, Salvad., of which I have seen two examples in Capt. Wardlaw Ramsay's collection.

2. DICÆUM PULCHRIUS, sp. n.

Dicæum rubrocoronatum, Sharpe, Journ. Linn. Soc. Zool. vol. xvi. p. 436 (nec Sharpe, 'Nature,' 1876, p. 339).

D. *similis* D. rubricoronato, *sed pilei colore scarlatino magis extenso et usque ad nucham producto, et præcipue corporis lateribus flavicanti-olivaceis nec cinereis distinguendum. Long. tot.* 3·2, *culminis* 0·4, *alæ* 2·05, *caudæ* 1·0, *tarsi* 0·4.

Hab. Astrolabe Mountains, S.E. New Guinea (*Goldie*). Type in B. M.

3. DICÆUM ÆNEUM, H. & J.

Mr. E. P. Ramsay has lent me a pair of birds from the Solomon Islands, and I find that the species is a very distinct one, allied to *D. pectorale*, but distinguished by its bronzy upper surface and the greater extent of grey descending on the chest, as well as the bright olive-yellow flanks.

4. DICÆUM TRISTRAMI, sp. n.

The type of this new species is in Canon Tristram's collection, and was obtained by Lieut. Richards in the island of San Cristoval. I add a full description of the specimen, as it is not to be compared to any of the other known species of Dicæidæ, belonging as it does to a group by itself, remarkable for its chocolate-brown back, black tail, and hoary grey face.

Adult Male. General colour above chocolate-brown, the mantle slightly streaked with a few hoary whitish margins to the feathers; wing-coverts darker chocolate-brown than the back; bastard-wing, primary-coverts, and quills blackish brown; the inner secondaries chocolate-brown, contrasting sharply with the back; head brown, but mottled with blackish-brown centres to the feathers, the plumes of the forehead and vertex margined with hoary white, the latter slightly mottled with brown bases; lores, eyelid, fore part of cheeks, and base of chin blackish; hinder cheeks, throat, and fore neck hoary white with brown bases to the feathers; sides of neck like the back; centre of breast, abdomen, and under tail-coverts pure white, the sides of the body ashy; sides of upper breast brown, with hoary whitish edges to the feathers; axillaries and under wing-coverts white; quills dusky below, ashy whitish along the edge of the inner web; "bill black; feet black; iris grey" (*Richards*). Total length 3·5 inches, culmen 0·45, wing 2·3, tail 1·15, tarsus 0·55. (*Mus. H. B. Tristram.*)

5. Dicæum schistaceum, Tweedd. Ann. & Mag. Nat. Hist. (4) xx. p. 537 (1877).

The type of this species, lent to me by Capt. Wardlaw Ramsay, appears to me to be a young bird of *D. rubriventer*, Less. The pale colour of the bill is characteristic of immaturity in this group of Flower-peckers; and in the British Museum there are some young specimens of the allied *D. hæmatostictum* which also differ from the adult in the absence of the red colour on the underparts and in being of the slaty grey above.

6. Dicæum inornatum.

Myzanthe inornata, Hodgs. in Gray's Zool. Misc. p. 82.

This is a species distinct from *Myzanthe ignipectus* of Hodgson, with which recent authors have united it. It belongs to the dull-coloured section of the genus, containing *D. concolor* and its allies. It is doubtless to this species that the young male recorded by Dr. Scully from Nepal (Str. F. 1879, p. 261) really belongs, as he had doubts as to its being referable to *D. ignipectus*. I have examined the types of *D. olivaceum*, Walden, from the Karen Hills, in Capt. Wardlaw Ramsay's collection, and find that they also belong to *D. inornatum* (Hodgs.).

7. Dicæum modestum, Tweedd. P. Z. S. 1878, p. 380.

This species appears to me to be the same as *D. everetti*, Tweedd., Ann. & Mag. Nat. Hist. (4) xx. p. 537 (1877).

8. Prionochilus percussus, Temm. Pl. Col. iii. pl. 394. fig. 2 (1826).

I have recently examined the type of *P. percussus* in the Leiden Museum, and find that it is distinct from the bird usually so called in collections from Malacca, Sumatra, and Borneo. The Javan bird, the true *P. percussus*, has the throat white, whereas the specimens from other above-named localities have a yellow throat, and must bear the name of *P. ignicapillus* (Eyton).

2. On the Diseases of Monkeys in the Society's Gardens. By J. B. SUTTON, Lecturer on Comparative Anatomy, Middlesex Hospital.

[Received November 15, 1883.]

When "a generally received opinion" is made the subject of careful investigation, it not unfrequently turns out to be erroneous. So with regard to the diseases of Monkeys living in this country. The general public hold the belief endorsed by the medical profession, that nearly all the Monkeys brought to England die from tuberculosis. After careful examination I fail to find any reasonable excuse for so widely spread an error.

In 1845 Dr. Percy, in a paper published in this Society's 'Proceedings' gave an account of his "Management of Monkeys in Confinement." At the end of the article he mentioned some diseases to which these animals are liable; in one only did he find *phthisis pulmonalis*, and that was in a Rhesus (*Macacus rhesus*), bought from an itinerant showman. Dr. Crisp reported upon sixty-seven inspections of the Quadrumana, with three cases only of tubercle. In 1881 the Pathological Society of London, on the proposal of Mr. Hutchinson, appointed a Committee to report on the present state of our knowledge of the diseases of the lower animals, and on the best means for its advancement, and especially to make use of the material available at the Society's Gardens, which, through the kindness and influence of Professor Flower, had been placed at its disposal by this Society[1]. Since that date, as one of their Committee, I have had excellent opportunities of investigating Comparative Pathology in all varieties of animals dying in the Society's Gardens, whereby much new matter has come to light. As the Quadrumana are so near to man, they have naturally attracted a considerable share of my attention.

From Dec. 1, 1881, to March 30, 1883, an interval of sixteen months, one hundred and ten Quadrumana of various species died. Of this number I examined the viscera of ninety-three.

1. *Tubercle.* This caused death in three instances only. Two were Rhesus Monkeys, and the third a Vervet Monkey, all Old-World species. The disease was unmistakable, tubercular phthisis associated with cavities in the apices of the lungs, in every point resembling the disease as met with in the human subject.

2. *Bronchitis.* A very slight attack of this affection appears to be rapidly fatal. It was met with in twenty-two cases, sometimes associated with emphysema, generally vesicular, but occasionally of the interlobular variety.

3. *Pneumonia* in its lobar form is not so common; three deaths alone could be satisfactorily traced to this cause. The lobular form is frequent, seven deaths having been occasioned by it. Three of the

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[1] *Vide* Path. Soc. Trans. 1882, "Report of Council."

cases were amongst the Lemurs, associated in one with cystitis. The prevalence of lobular pneumonia results from the frequency of bronchitis and rickets.

4. *Empyema.* Two cases.

5. *Abscess* of lung burst into a bronchus filled the trachea, and thus suffocated a Baboon.

6. *Œdema* of lung killed a Squirrel-Monkey.

7. A not uncommon mode of death in young animals is *alveolar abscess* leading to ulceration and sloughing of the gums, the purulent discharges are swallowed, some getting inspired (possibly during sleep) and septic pneumonia established, sometimes leading to gangrene of the lung. This proved fatal in a young Chimpanzee.

8. *Scrofula* was well marked in three cases—a Baboon with caseating glands in the neck, a Capuchin with suppurating glands in the axilla, and lastly a Rhesus Monkey with a caseating mass in the dorsal region of the thorax associated with spinal caries, paraplegia, and meningitis, which gradually extended to the cranium and caused death.

9. *Intussusception* of the jejunum killed a very fine Lemur. I find that cases of intussusception occur among animals after a sudden chill. Garrod noticed this fact with regard to a Kangaroo, an Emu, and a Paradoxure, and reported the same in the Society's 'Proceedings' 1873. He says:—"During the first week of this month (February) the cold weather coming on suddenly seems to have caused the death of three animals in the Gardens, in all of which on post-mortem examination it was found that the lesion was the result of excessive and abnormal movement in the abdominal viscera."

The telescoped condition of the small intestines is very common among animals, and probably occurs during the agony: this is easily distinguished from true invagination of the bowel. Whether a sudden chill may cause an invagination of intestine in man is a subject for inquiry.

10. *Leucocythemia* was met with in a Lemur, the spleen of the animal having become enlarged to fifty times its normal bulk. The proportion of leucocytes in the blood was one to eighty red corpuscles. This is interesting, inasmuch as these creatures come from Madagascar, an island famous for ague. Lemurs are very liable to cataract. The reason why is not very obvious. One Lemur died from purulent pericarditis due to perforation of the pericardium by a caseating lymphatic gland.

11. *Typhoid fever* proved fatal in four cases, three Lemurs and one Monkey. Two of the Lemurs lived in the same cage. The animal first affected suffered from profuse diarrhœa, and at the autopsy perforation of the ileum was found, all the ulcers being confined to the neighbourhood of the ileo-cæcal valve. The second died seven days after its companion, from severe hæmorrhage; ulceration of the agminate and solitary glands had taken place from the commencement of the ileum to within half an inch of the anus. It is very probable that the second Lemur contracted the disease by direct inoculation from its mate for the following reasons:—

(*a*) The animal which died first was the one first observed to be ill.

(*b*) The fæcal discharges were so profuse that the keeper had difficulty in keeping the cage clean.

(*c*) The companion Lemur jumping about the cage, not merely contaminated her own body but occasionally dropped her food into the fæces, thus taking the morbid material directly into the alimentary canal in contact with the Peyerian glands.

(*d*) The unusual length of intestine found ulcerated also lends support to the notion of direct contagion.

The fact that the mucous membrane of the rectum was ulcerated is a point of some interest. In conducting post-mortem examinations, on human subjects dying of typhoid fever, it rarely happens that the rectum is examined. Profiting by the experience gained in examining these Monkeys I have in all cases of typhoid fever, where the opportunity has occurred, examined the condition of the mucous membrane at the lower end of the alimentary canal, and have found in some cases a ring of infiltration and ulceration about half an inch above the anus. The explanation is not far to seek. If the rectum be split longitudinally it will be seen that half an inch above the anus there is an abrupt change in the mucous membrane, the squamous epithelium of the anus being suddenly replaced by the columnar variety, beneath which is a substratum of lymphoid and glandular tissue. It is this ring of tissue which in typhoid fever undergoes infiltration, ulceration, &c., as does a Peyer's patch or solitary follicle in the ileum.

Rickets. A very unexpected cause of death manifested itself in bone disease, in the form of typical rickets. Next to bronchitis this is the most frequent cause of death among the Monkeys. During the past summer I have been able to observe the animals suffering from this disease, and can give a fairly complete clinical history of the affection.

When a Monkey becomes affected with rickets he is less active than usual, and instead of leaping about from place to place, sits on the floor. Gradually paralysis of the lower limbs comes on; the creature now moves about by using his long arms as crutches. The bones soften, and those of the upper limb, having to support the weight of the body in progression, begin to bend. The paralysis of the lower limbs increases, and the creature becoming completely paraplegic, loses control over the sphincters and suffers from incontinence of urine and fæces, and occasionally from priapism. The ribs and sternum share in the general softening, allow the thoracic parietes to yield to atmospheric pressure, causing embarrassment of respiration; the animal gets an attack of bronchitis, and soon dies. Such a case as this is a severe one, but I have watched a Monkey apparently in good health die horribly deformed with rickets in four months. It is highly probable that many less severe cases have been overlooked, so that at present it is impossible to state with any degree of accuracy the relative frequency of death from this cause, but it is a very prevalent disease. Its chief symptoms may be briefly enumerated as deformity, pain, paraplegia, incontinence of urine and fæces. Dr. Percy, in the paper before alluded to, states that some of his Monkeys died from mollities ossium, the symptoms being deformity and paralysis.

The condition of the skeleton in such cases is very remarkable. The bones are enlarged, and so soft that they can be cut with a knife as easily as a potato; in severe cases not a bone escapes, not even the hyoid; indeed they exhibit in an extreme degree the pathological condition met with in rickets as it occurs in young children. I find the disease has two opposite effects on the skull. In most Monkeys the bones of the cranium soften and in parts undergo thinning; sometimes they atrophy so as to give rise to actual perforation of the skull: this condition is most frequently observed in the cerebellar fossæ and roof of the orbit; now and then it is seen on the roof of the skull. In other Monkeys, chiefly the Baboons, the skull-bones thicken. In some cases I have observed the roof of the skull to be as much as half an inch in thickness. A complete account of the pathology and microscopic appearances of the various parts of the skeleton in these cases will be found in the Transactions of the Pathological Society, volume xxxiv.

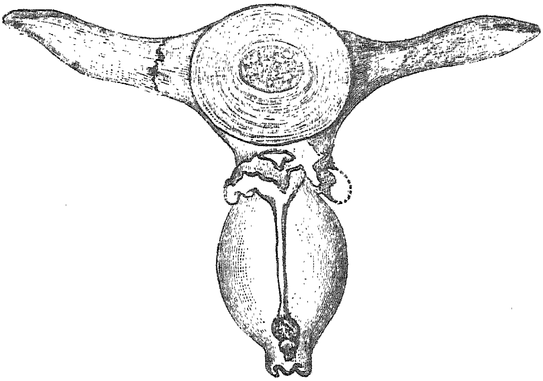
There yet remains the paralysis to be accounted for; this symptom perplexed me extremely, but I am now able to give a satisfactory explanation of it.

The 'Journal de Zoologie' for 1875 (iv. p. 272) contains an interesting article by Paul Gervais, entitled "De l'hyperostoze chez l'homme et les animaux." Among the specimens there figured is a vertebra from an animal named *Pachyacanthus* dug up near Vienna. It is a very singular specimen, and shows a condition which is very rarely met with, viz. gradual general obliteration of the spinal canal due to overgrowth of bone. This supplied the hint, and I divided the spinal column in all rickety Monkeys. This is what I found:—The general overgrowth and softening of bone so common throughout the skeleton had not spared the vertebræ with its various processes, but they had enlarged and encroached upon the spinal canal and thus exercised general slow compression upon the spinal cord. When the creature stands, the pressure of the superincumbent weight would cause the vertebral bodies to bulge and compress still more the spinal cord and nerves as they emerge from the various intervertebral foramina, hence the pain when the creature is raised; the continuous irritation of the lumbar spinal cord will also explain the incontinence and priapism. I am not aware of any recorded cases of such general narrowing of the neural canal; and it is easy to explain why it has been overlooked, for it is usual to expose the cord by removal of the vertebral arches, thus destroying the relative size of the cord to the spinal canal; whereas if a transverse section of the column be made with the cord *in situ*, the change is obvious. The cord and nerves when examined microscopically exhibit all the changes found in the grey and white matter when the cord has been compressed from other causes, such as cancer, tumour, vertebral caries, &c. It is very probable that the agonizing pains which form so marked a feature in mollities ossium in human beings may result from a similar condition of the spinal column.

The principal cause of rickets in Monkeys is the fact that many of them are captured when quite young, and in lieu of the breast-milk of the mother are fed on fruits, rice, and cows' milk.

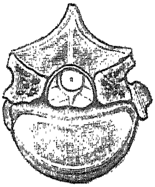
It may be mentioned here that the Royal College of Surgeons possesses a Hunterian preparation of a rickety Monkey.

Fig. 1.



Vertebra of *Pachyacanthus*, showing the narrow spinal canal (after Gervais, *l.c.*).

Fig. 2.



Transverse section of the vertebral column with the cord *in situ*, to show the mode in which the cord gets compressed by overgrowth of the surrounding bone. From a Monkey.

The Milk-white Patch. In conducting human post-mortems it is very usual to find on the anterior surface of the heart a thickening of the visceral layer of the pericardium, technically known as the "milk-white patch," concerning the causation of which pathologists have held two opposite notions. One opinion is that the thickened area is the result of chronic inflammation. The other and more probable view holds that it is due to pressure: this is called the "attrition" theory.

This milk-white patch is often met with in Monkeys, but on various parts of the heart, sometimes on the auricles, at others on the ventricles; but it is always due to pressure either from an enlarged gland, deformation of the thorax, pressure of an abscess, or some such cause. But the most convincing case occurred in a young Rhea, which was affected with rickets, so that the ribs yielded and allowed the heart to be compressed between the broad sternum and the vertebral column. In this case the anterior surfaces of the ventricles and the right auricle were covered with a large milk-white patch due to the pressure of the sternum.

In conclusion I would remark that in merely recording the diseases of wild animals in confinement little is to be gained, but in elucidating the diseases of man Comparative Pathology will act as a side light of no mean power.

3. On the Habits of *Thomisus decipiens*, a Spider from Sumatra. By H. O. Forbes, F.Z.S.

[Received November 20, 1883.]

(Plate LI.)

Having sent the specimen now exhibited to Mr. O. P. Cambridge for determination, he writes me :—"I believe it to be undescribed. Mr. Blackwall has described a tolerably near ally from the E. Indies, *Thomisus tuberosus*, Bl., and Karsch has described several which appear to belong to the same group from other quarters; but I do not think yours is the same species as either, even if of the same group, which, as Karsch gives no figures, is not certain. I have close allies from E. Indies and Ceylon, and also from S. Africa, none of which have as yet been described. The S.-African species is almost exactly similar in its colouring and manner of sitting, so as exactly to resemble the droppings of birds; this was specially noted to me by the friend who sent the specimens to me, and I have just shortly noted it as an instance of protective resemblance in 'Spiders of Dorset,' vol. i. p. xxix of Introduction. * * *. This group ought to form a genus separate from *Thomisus*, but you might describe yours provisionally as a *Thomisus*." I therefore propose to give this interesting specimen the surname of *Thomisus decipiens*, in order to identify it with the account of its habits which I am now about to give.

On June 25, 1881, in the forest near the village of Lampar, on the banks of the Moesi river in Sumatra, while my "boys" were procuring for me some botanical specimens from a high tree, I was rather dreamily looking on the shrubs before me, when I became conscious of my eyes resting on a bird-excreta-marked leaf. How strange, I thought, it is, that I have never got another specimen of that curious Spider I found in Java which simulated a patch just like this! I white, the rest of the underparts white, the feathers on the flanks broadly tipped with crescentic spots of black; axillaries, basal half white, terminal half black; under wing-coverts, basal half brown, terminal half white; basal half of inner web of secondaries and basal portion of many of the primaries white; upper mandible sooty grey, lower yellow; irides ash-brown; legs, feet, and claws pale flesh-colour. Wing 4½ inches, tail 3·2, culmen 1·05, tarsus 1·4. (No. in collection 583 g.)

I propose that this new species should bear the name *machiki*, as a slight mark of remembrance of Dr. Julius Machik, of Buda-Pesth, Surgeon-Captain in the Dutch Army, and of appreciation of his extreme kindness and hospitality, and of the very great assistance rendered by him to me in Sumatra, and more especially in Amboina to my wife and myself, both before and after our return from the Tenimber Islands. Dr. Machik is well known in the Archipelago for his extensive collections, especially of Mollusca and fishes.

In the Society's 'Proceedings,' 1883, p. 56, the "*Geocichla* sp. inc.," recorded by Mr. Sclater (in describing my Timor-Laut collections), with a note by Mr. Seebohm, was an immature specimen of *G. machiki*. The present specimen, having been inadvertently mislaid among Amboina skins, was not transmitted, I regret to say, along with my Tenimber collections. It will be added, however, to the set selected by the British-Association Committee, and presented by them to the British Museum.

I have also to remark on another of the Tenimber birds collected by me, and described and figured by Mr. Sclater (P. Z. S. 1883, p. 198), as a new species under the name of *Pachycephala fuscoflava*. I much regret that by an oversight this specimen also, the only specimen of the adult male of the bird obtained by me, should have been retained behind, having become mixed with the Amboina specimens of that family in my own collection. It will be seen from the specimen now exhibited (Plate LIII.), that the male *Pachycephala fusco-flava* (no. 572 on label) previously figured by Mr. Sclater is an immature bird, in which, however, on closer examination traces of the black colour of the top of the head are discernible on one or two of the small feathers.

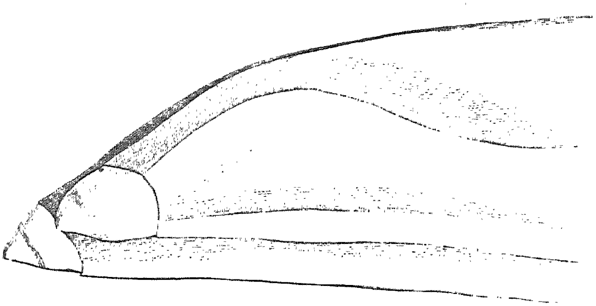
I exhibit also an apparently somewhat rare bird, as I find it is unrepresented in the National collection—*Tanygnathus gramineus*, from the island of Boeroe; also a specimen of *Megalurus amboinensis* from Amboina; and lastly, I have the pleasure of laying on the table specimens of the new *Myzomela* which I had the satisfaction of discovering in Boeroe, and which I have already described as *M. wakoloensis* (see P. Z. S. 1883, p. 115).

5. Further Notes on *Ziphius* (*Epiodon*) *novæ zealandiæ*, von Haast. By Professor JULIUS VON HAAST, C.M.G., Ph.D., F.R.S., C.M.Z.S.

[Received November 20, 1883.]

In a paper submitted to the Society on April 6, 1880 (see P. Z. S. 1880, p. 232), I gave a description of a female of this interesting Goose-beaked Whale, together with a drawing, showing that numerous attacks had been made upon it, by which the skin had become covered with a large number of oval and seamed scars. At the same time I pointed out that the teeth of the females, in aged individuals disappearing altogether below the gums, were generally covered with a rugose cement to the very tips, and that they could therefore not be well used for the purpose of attack and defence. Consequently I supposed that the scars were due to the attacks of the males, of which, at that time, no specimen had been secured.

Fig. 1.



Lower jaw of *Ziphius novæ zealandiæ*, side view; one third natural size.

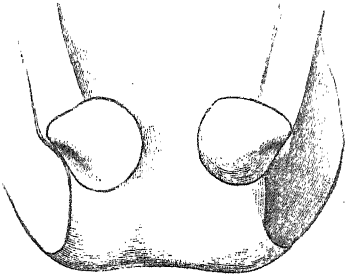
However, to confirm such a supposition I drew attention to the fact that several skulls had been obtained in which the teeth were not only much larger and heavier (according to Dr. Hector 817 and 836 grains against 62 to 202 grains, the weight of the female teeth), but moreover were worn down into two lateral facets divided by an acute ridge, so that they had evidently been used. These skulls naturally were considered to have belonged to males.

On the 13th of June of this year, the news reached me that a Whale had been stranded the day before near the mouth of the Ashley, and though, when reaching the locality, the carcase had already been partly cut into to obtain the blubber, there was a sufficient portion of the skin left intact to show that the coloration was exactly the same as that of the specimens previously examined, and that the animal was seamed and scarred in exactly the same manner as the two females formerly described.

On examination the animal proved to be a male, 20 feet long, apparently full grown, the terminal epiphyses being thoroughly ankylosed to the bodies of the vertebræ. It is thus evident that the males not only attack the females, or perhaps, more correctly, coerce them in a violent and painful manner to accept their attentions, but that they fight also amongst themselves in the same savage mode.

The two teeth, where they rise above the gums, measure 1·27 inch in height, and are here at their base and in their largest antero-posterior diameter 1·25 inch broad. For about $\frac{1}{3}$ of an inch the crown is devoid of dentine, and shows that it has been well used. The teeth are conical, and there is just an indication of a slight ridge, by which the inner side is divided from the outer side; but there is nothing like the acute ridge with two lateral facets, as described by Dr. Hector in similar teeth, exhibited in either of them. In illustration of these notes I forward a side and an upper view of the front portion of the lower jaw, belonging to the specimen under review.

Fig. 2.



Lower jaw of *Ziphius novæ zealandiæ*, upper view; one third natural size.

Thus we have here a confirmation of my previous suggestion that the males of *Ziphius novæ-zealandiæ* have much larger teeth than the females, and that the scarring and seaming has been done by the former, both to males and females indiscriminately.

6. Notes on a Skeleton of *Balænoptera australis*, Desmoulins, the Great Southern Rorqual or "Sulphur-Bottom" of Whalers. By Prof. JULIUS VON HAAST, C.M.G., Ph.D., F.R.S., C.M.Z.S.

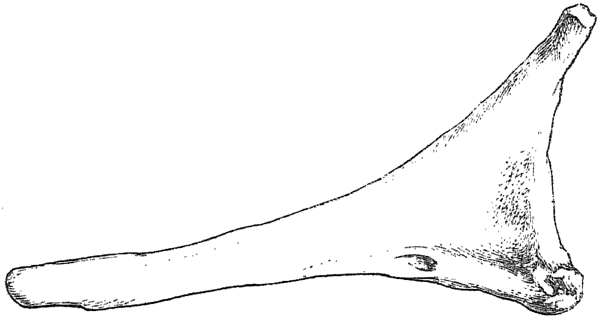
[Received November 20, 1883.]

On the evening of April 20th, 1881, the news reached me that a large Whale had been washed up on the New Brighton beach, about five miles from Christchurch.

On arriving at the locality next morning, I found it to be the carcase of a large Southern Rorqual, about 67 feet long. The exact length could not be ascertained, the specimen not lying quite straight. It was a male, and had probably been dead from four to five weeks. The animal had been torn considerably by sharks, and the whole baleen had been lost before it landed on the beach. It was lying nearly on its back, and a great portion of the blubber, as far as exposed, had already been cut off.

The position and form of the dorsal fin could not be ascertained, and unfortunately I omitted to leave instructions to investigate these particulars when the upper portion of the carcase was examined. The throat and belly, of a clear white colour, were deeply plaited, the sides and back being of a bluish-black tint.

Fig. 1.



Right pelvic bone of *Balænoptera australis*; one fourth natural size.

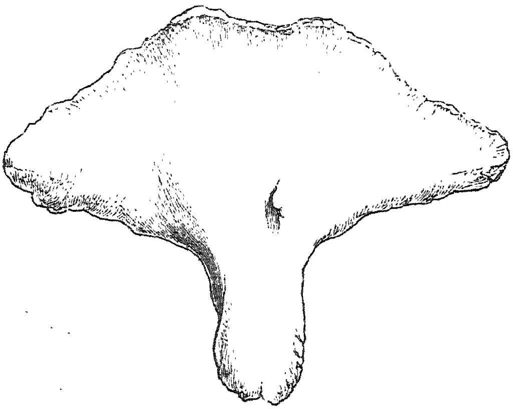
The total length of the skeleton (allowing for cartilage) is 66 feet, the skull measuring 16 feet, and the vertebræ 50 feet. There are 7 cervical, 15 dorsal, 15 lumbar, and 25 caudal; altogether 62 vertebræ. The cervical vertebræ are all free, and resemble closely those described and figured by Dr. Hector (Transactions New-Zealand Institute, vol. vii. page 258). The lateral processes are united, and form a complete ring; that in the atlas is rather small, but in th five following becomes large.

The seventh cervical vertebra possesses only the two upper transverse processes, well developed, and expanding near their extremities. Only a small protuberance exists on each side of the body, representing the lower transverse processes.

The forms of the 15 ribs are exactly like those described by Dr. Hector, and need no further comment. We possess only 14 chevron bones, but it is very probable that, in extracting the skeleton, some of the smaller have been overlooked. The sternum, 17 inches in height and 20½ inches in breadth, also resembles the one figured by Dr. Hector. A drawing of that bone accompanies these notes.

I also add a drawing of the right pelvic bone (fig. 1, p. 592): the left is similar in form. Its greatest length is 13 inches, its greatest breadth 6 inches. There was not the least sign of any small bone attached to it, which according to Professor Flower occurs in *B. musculus*, and might be considered as a rudimentary femur. There is, however, near the spot where this little bone was observed by our learned President, a small foramen passing vertically through the bone.

Fig. 2.



Sternum of *Balænoptera australis*; one eighth natural size.

The anterior limb is identical in form with the one figured by Dr. Hector, of which, however, some of the phalanges of the middle fingers have been lost; and in comparing this part of our specimen with the bones of the complete fore limb of *Balænoptera musculus* on plates xii. and xiii. (no. 20) of the 'Ostéographie des Cétacés' by Van Beneden and Gervais, I find that they correspond to each other in every respect.

An examination of the New-Brighton skeleton as a whole shows, in the first instance, that it closely resembles in all its principal characteristics that described and figured by Dr. Hector in the Transactions of the New-Zealand Institute, with the exception that it has 62 vertebræ instead of 64 as in the Wellington skeleton. It is, however, possible that there may be some mistake in the number of caudal vertebræ of the latter.

I have looked carefully over the description of the different species of *Balænoptera* accessible to me, and find only one, *B. sibbaldi*, possessing 64 vertebræ, but there are 16 dorsals, or one more than in Dr. Hector's specimen.

Till a specimen of this New-Zealand species is obtained, of which the external form can be exactly ascertained, I do not wish to pronounce a decided opinion as to the specific position of *Balænoptera australis*. However, judging from the evidence before us, the skeleton under review resembles so closely in all its osteological peculiarities that of *B. musculus*, that it would be a most remarkable fact if both did not belong to the same species.

7. On the Terrestrial Mollusca of Dominica, collected during a recent visit to that Island. By GEORGE FRENCH ANGAS, F.L.S., C. M. Z. S.

[Received November 20, 1883.]

The island of Dominica, lying almost midway between Martinique and Guadaloupe, in about 15° north latitude, is the most lofty of the Lesser Antilles, some of its peaks rising to an altitude of over 5000 feet. It is of volcanic formation, and densely wooded, two thirds of the island being still covered by primæval forest. The rainfall averages over 70 inches in the year.

I was certainly disappointed in finding the number of genera and species of Land-shells so limited, and the forms so small, as, from the favourable conditions of the island for molluscan life, I should have expected a richer harvest. I give below a list of the species collected by myself during a two months' visit to this beautiful island, being only some 20 in all.

INOPERCULATA.

SUBULINA (STENOGYRA) OCTONA, Chemn.

Common in most localities, under stones and decayed leaves.

This species appears to have an extended range amongst the West-India islands, reaching to Mexico and Costa Rica.

ZONITES CONCOLOR, Férussac, = *H. baudoni*, Petit.

Not common, at an altitude of 2000 ft.

This species is said to occur also in Porto Rico.

SUCCINEA APPROXIMANS, Shuttleworth.

A small species, of a pale fulvous hue. Not abundant, found at an altitude of 200 or 300 feet.

Described as coming also from Guadaloupe and Porto Rico.

SUCCINEA TIGRINA, Lesueur,=*Amphibulina pardelina,* Guppy.

A very beautiful hyaline shell, irregularly sprinkled with small brown spots. It belongs to the group *Brachyspira* of Pfeiffer.

My specimens were obtained by negro boys at Laudat (2000 ft.) and also near the Lihoo River, nestling in the fronds of bananas. One or two were also taken at the base of the falls in the Roseau Valley.

AMPHIBULIMA PATULA, Brug.

This curious species is the type of the genus *Amphibulima* of Blainville. It occurs in company with *S. tigrina* amongst the moist stems of the bananas and plantains, ranging, from 2000 feet at Laudat, to the sea-level. I found a very fine specimen with the animal burrowing in the heart of a pine-apple in a negro clearing not ten yards from the sea. It was first found at the island of St. Kitts; and has also been taken in Guadaloupe. I give a figure of the animal from life, which is of a pale greenish yellow, the mantle bordered with orange.

Fig. 2.

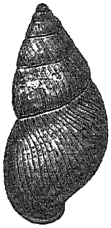


Fig. 1.

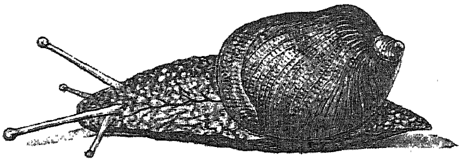


Fig. 3.

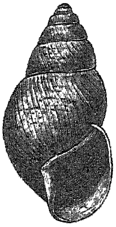


Fig. 1. Shell of *Amphibulima patula* with animal, from life; nat. size.
2, 3. *Bulimus nichollsi*; nat. size.

SUCCINEA (OMALONYX) GUADALOUPENSIS, Less.

Of this remarkable species I found only a single specimen, alive, in a damp locality at St. Arament, 200 feet above the sea.

TORNATELLINA (LEPTINARIA) LAMELLATA, Pot. et Mich.,= *Tornatellina antillarum,* Shuttleworth.

Somewhat rare; at about 500 feet altitude.

BULIMUS NICHOLLSI, A. D. Brown, MSS.

The discovery of this species is due to the researches of Dr. A. D. Brown, of New Jersey, U.S.A., who named it in manuscript after our mutual friend Dr. H. A. Nicholls of Dominica. As, however, he has not given a description of it, I now do so, retaining his manuscript name. It is the largest land-shell hitherto discovered in Dominica, measuring 1 inch 3 lines in length. It occurs on the path from Roseau to Rosalie at an altitude of about 2000 feet. It bears a strong resemblance to some species of the genus *Partula*, especially in the expansion and partial thickening of the outer lip. It is an arboreal species.

Shell rimately perforated, elongately ovate, rather solid, dark olive-brown, finely irregularly longitudinally striated, crossed here and there by very thin concentric lines breaking the longitudinal sculpture, especially on the upper whorls; spire elevately conical; sutures impressed; whorls 6–7, flatly convex; aperture ovate; outer lip slightly expanded and thickened, paler in colour than the rest of the shell; columella triangular, a little thickened and flattened inwards towards the base.

Diam. 7, alt. 10 lines.

Hab. Island of Dominica, W. I.

BULIMUS (LEPTOMERUS) LILIACEUS, Guilding, MSS.

This pretty species was first met with in the island of St. Vincent by the late Mr. Guilding, who gave it the above MS. name. It was afterwards described and figured by Reeve in the 'Conchologia Iconica.' It is rare in Dominica, on trees in the forests at an altitude of 2000 ft. It may be at once distinguished by its uniform pale primrose-colour.

BULIMUS (LEPTOMERUS) MULTIFASCIATUS, Lam.

On trees at an altitude of about 2000 ft., very rare.

BULIMUS (LEPTOMERUS) EXILIS, Gmelin.

This species is very abundant on the lower slopes down to the sea-level.

There are at least three well-marked varieties of the shell, viz:—

a. Entirely of a pale fulvous colour.

b. With a narrow black band encircling each whorl.

c. With the base of the last whorl black, and with several broader bands of the same colour surrounding the whorls.

The shells also vary considerably in their proportions as regards length and breadth. The species is terrestrial in its habits.

HELIX (DENTELLARIA) DENTIENS, Fér.

This is one of the commonest species of *Helix* in the island, occurring plentifully in various places from 600 or 800 ft. to the sea-level. Under dead logs, loose stones, and decayed leaves.

HELIX (DENTELLARIA) BADIA, Fér.

This species, which is smaller than *H. dentiens*, is extremely abundant everywhere in the neighbourhood of Roseau, down to the sea-level. It is terrestrial, and frequents gardens and plantations. There is a variety of a greenish colour with a decided double brown band, but the normal colour of the shell is dark brown throughout. The specimens I collected vary much in size. The young shells are umbilicated.

HELIX (DENTELLARIA) NIGRESCENS, Wood.

Remarkable for its globular form and strongly marked dentition. It is common on the Lake-mountain road, and in various localities above 1000 feet.

HELIX (DENTELLARIA) JOSEPHINA, Fér.

This handsomely marked species is common in places above 1500 feet. I met with it in company with *H. nigrescens*. It occurs also in Martinique and Guadaloupe.

VAGINULA OCCIDENTALIS, Guilding.

A slug-like creature, without a shell, belonging to the family *Veronicellidæ*.

I found nine specimens under dead bark in damp places, not far from the sea.

OPERCULATA.

CYCLOPHORUS AMETHYSTINUS, Guppy.

Mr. Guppy, of Trinidad, has described this species in the 'Annals of Natural History' for 1868, but he erroneously calls it a *Cyclotus*, which it is not, it having a *horny* operculum, and not a shelly one as in *Cyclotus*. Above 1200 feet, moderately common.

HELICINA (PACHYSTOMA) RHODOSTOMA, Gray.

This beautiful *Helicina* is found sparingly on the track from Roseau to Rosalie on the windward side of the island, at an altitude of about 1500 feet. It is arboreal in its habits. It may be at once distinguished from all other species by the vertical spine at the base of the columella. The peristome is sometimes black, sometimes yellow or white, and occasionally of a deep rose-colour.

HELICINA (PACHYSTOMA) FASCIATA, Lam.,=*H. convexa*, Pfr.

At an altitude of several hundred feet. Also found at St. Vincent and Barbadoes; the Barbadoes specimens are much more brightly coloured and painted. The examples I collected in Dominica vary somewhat in size.

HELICINA (IDESA) VELUTINA, Guppy.

A small brown species, abundant on all the lower slopes, adhering to rocks and stones.

December 18, 1883.

Prof. Flower, LL.D., F.R.S., President, in the Chair.

The Secretary made the following report on the additions to the Society's Menagerie during November 1883:—

The total number of registered additions to the Society's Menagerie during the month of November was 109, of which 64 were by presentation, 24 by purchase, 3 by birth, 6 received in exchange, and 12 received on deposit. The total number of departures during the same period, by death and removals, was 132.

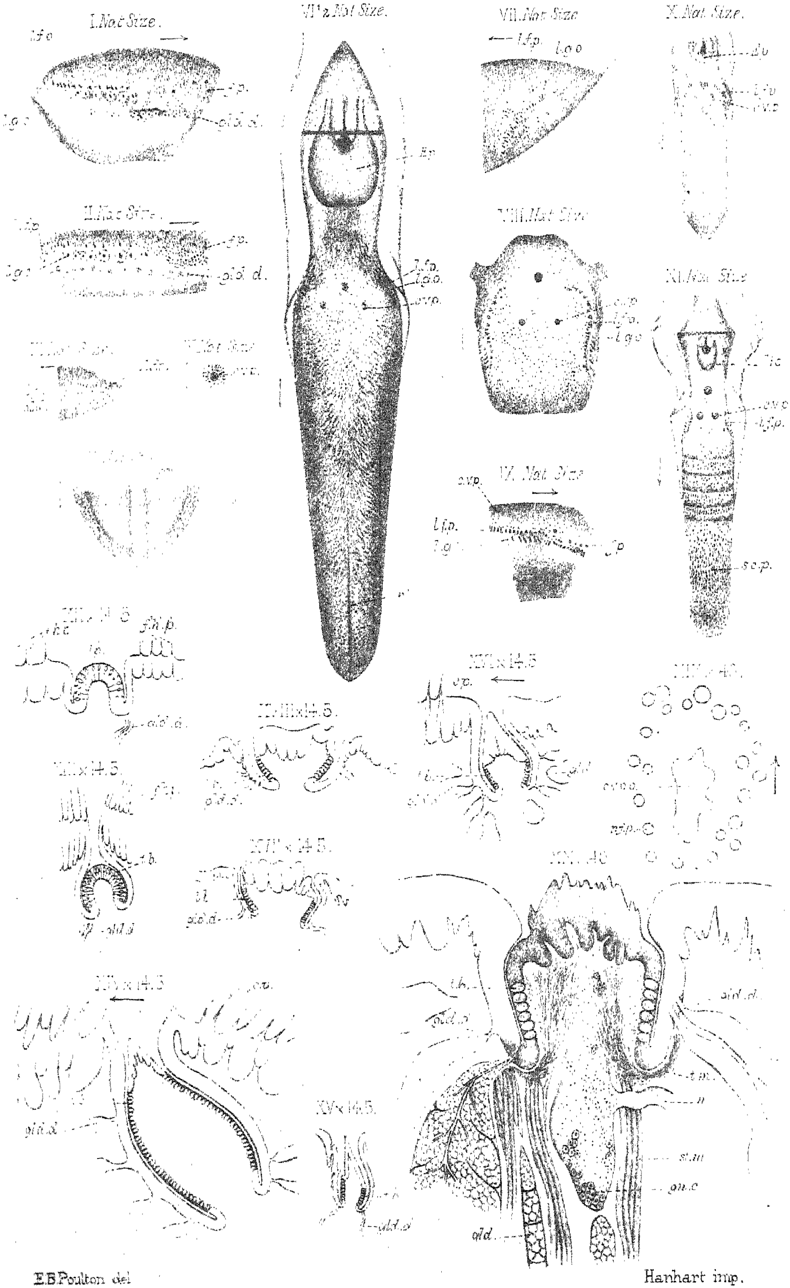
The most noticeable additions during the month were:—

1. A pair of Gold Pheasants (*Thaumalea picta*), presented November 16th by Sir Henry W. Tyler, and remarkable for the hen bird having gradually assumed the (now nearly complete) dress of the male.

2. A young pair of the singular Deer of Mantchuria called Père David's Deer (*Cervus davidianus*), purchased November 16th of the Société d'Acclimatation of Paris. The only previous specimens of this animal in the Society's Menagerie were the pair presented in 1869 by Sir Rutherford Alcock, K.C.B. (see P. Z. S. 1869, p. 468). The present pair were bred in the Zoological Gardens of Berlin from imported parents.

Dr. Franz Leuthner read an abstract of a Monograph of the *Odontolabini*, a subfamily of the Lucanidæ.

Dr. Leuthner commenced his work by giving an account of the circumstances which had led him to undertake the study of this small group of Coleoptera, in the hope of being able to throw further light on difficult problems connected with the origin of species. In the introductory part he dwelt upon the great difference of treatment which the same group of animals or plants receives from authors holding different views as to the limits of species—one author often placing a number of allied forms together, and another subdividing them into many so-called species. Having spoken of the necessity of examining a long series of specimens in different stages, and from various localities, before such questions can be definitely settled, he passed on to discuss the variability of the *Odontolabini*, a group in which the polymorphism of the secondary characters of the males reaches an extreme development. The females were very similar to each other, varying little except in size, but the males exhibited four very distinct phases of development of mandibles, for which the author proposed the terms *priodont*, *amphiodont*, *mesodont*, and *telodont*. These forms were sharply defined in some species, and in others were connected by insensible gradations, and the various forms had been treated by earlier authors as distinct species. All the four forms were not met with in every species, some exhibiting only one, two, or three of them. Dr. Leuthner also remarked on the variability exhibited by different por-



E.B.Poulton del.

Hanhart imp.

TONGUES OF MARSUPIALS.

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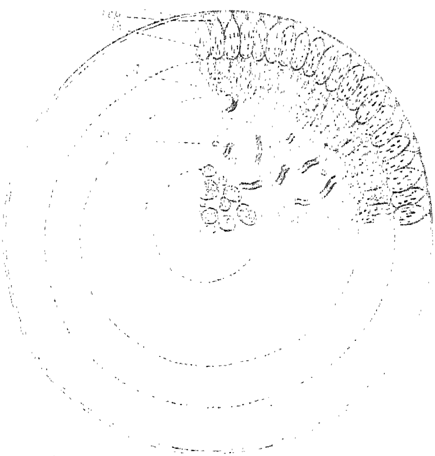

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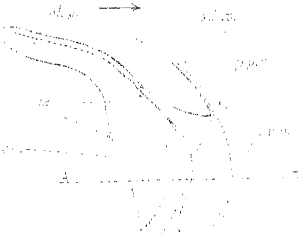

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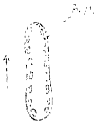

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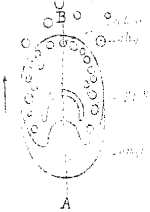

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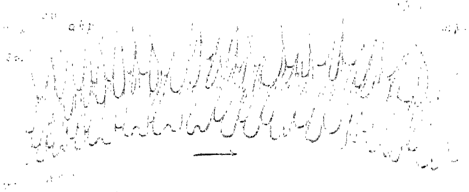

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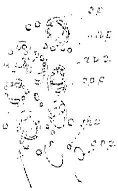

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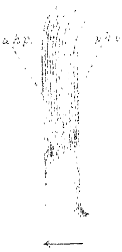

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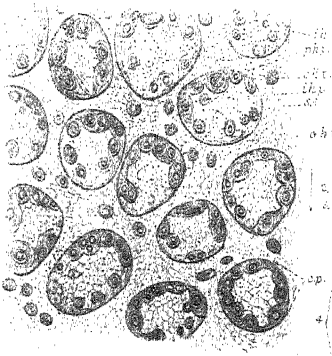

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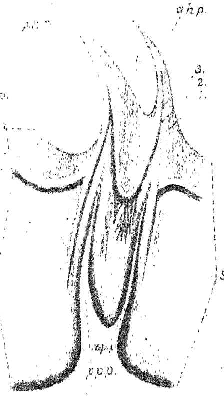
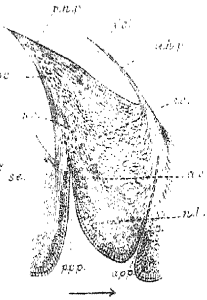


XXX × 50



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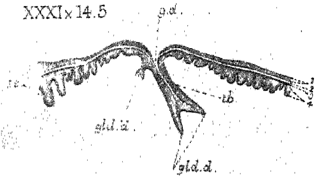

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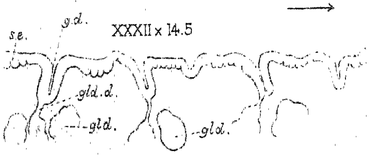

tions of the body in Lucanidæ in general. He then pointed out that most of the *Lucanissi* and *Dorcini*, unlike the *Odontolabini*, differed comparatively little except in size, whereas the latter subfamily must be regarded as polymorphic. The variability and plasticity of many *Odontolabini* was so great, that it was practically impossible to separate them into sharply distinct species. The chitinous portions of the male sexual organ were valueless as specific characters in this group.

In the second, or systematic part of his paper, Dr. Leuthner monographed the three genera *Neolucanus*, Thoms., *Heterochthes*, Westw., and *Odontolabis*, Hope, which form the subfamily Odontolabini, giving full synonymy, and carefully describing the female and the various forms of the male in each species.

This memoir will be published entire in the Society's 'Transactions.'

The following papers were read :—

1. On the Tongues of the Marsupialia.

By Edward B. Poulton, M.A., F.Z.S.

[Received December 18, 1883.]

(Plates LIV., LV.)

I am greatly indebted to the kindness of our Secretary for supplying me from the Society's collection with a great part of the materials upon which this paper is written. I have received from him spirit specimens of the tongues of *Macropus*, *Belideus*, and *Didelphys*, and fresh specimens of those of *Petrogale* and *Dasyurus*.

Professor Moseley also very kindly gave me excellently prepared tongues of *Halmaturus*, *Phalangista*, and *Perameles*, and a spirit specimen of *Acrobates*. These specimens were obtained in 1874, and are described in the 'Notes by a Naturalist on the Challenger.' I was also fortunate enough to procure a living specimen of *Phalangista vulpina*.

In a previous paper ("The Tongue of *Perameles nasuta*") in the 'Quarterly Journal of Microscopical Science' for January 1883, I described a new type of compound filiform papilla, which I then thought to be peculiar to that animal and modified for the capture of insects. I now find that it is characteristic of the Marsupial tongue, and I propose for it the name "coronate papilla." During my work upon this organ I find it absolutely necessary to use new terms in addition to the old ones (which I retain as far as possible), as these latter do not cover the ground. I therefore add a provisional list of the technical terms used in such descriptions as are contained in the present paper. New terms are printed in italics.

Circumvallate papillæ.—Used in its old sense for the large bulb-bearing papillæ (or in some cases ridges) at the back of the upper surface of the tongue, always sheltered by a trench, and sometimes very completely protected. Gustatory.

Posterior angle.—The angle made by the posterior circumvallate papilla with the two anterior papillæ, when only three are present, arranged in an isosceles triangle (universal in Marsupials).

Lateral gustatory organ or lateral organ.—Used in its old sense. The term foliate organ or papilla foliata is misleading in directing the attention to the ridges instead of to the grooves (which are primary). Gustatory.

Fungiform papilla.—In its old sense, except that it should not be used for the circumvallate papilla. The latter is primarily gustatory, the former primarily, and perhaps ultimately, tactile.

Filiform papilla.—The old sense. It may be either mechanical or tactile. Its papillary process bears secondary processes.

Hair-like papilla.—A very fine filiform papilla of which the papillary process does not bear secondary processes. Mechanical.

Coronate papilla.—A compound filiform papilla; the summit being crowned by a ring of recurved hair-like papillæ. Mechanical. Characteristic of Marsupials.

Fasciculate papilla.—A convenient term for the compound filiform papilla in which the secondary papillæ are not arranged in a circle, but brush-like. Mechanical.

I will now proceed to describe the tongues, beginning with those that least resemble this organ in higher mammals, and gradually working upwards.

THE TONGUE OF *Halmaturus ualabatus.*

The material consisted of the back part of one tongue, the lateral gustatory organs of others, and the part containing a circumvallate papilla. All these had been hardened in chromic acid and were in excellent condition.

General description.—The smaller tongue was 27·5 mm. in width posteriorly (although there was some distortion due to cuts permitting the entrance of the hardening fluids); the other dimensions are shown in fig. I. Plate LIV., and from this also the size of the complete organ is suggested. The upper surface is densely crowded with large coronate papillæ, between which, just above the smooth lateral surface, a few fungiform papillæ of normal appearance are scattered. The lateral gustatory organ is in the form of a series of mound-like elevations (about six in number), placed just below the posterior part of the side of the papillate surface (see figs. I., II., III. Plate LIV.). At the summit of each elevation an elongated (sometimes circular) depression is situated like a crater. The whole appearance suggests a series of gland-ducts; and this view of the origin of the lateral gustatory organ is confirmed by a study of the minute structure. Below these elevations there is a less regular, longer row of smaller depressions sometimes situated upon mounds, but in some cases only surrounded by slightly raised rings. These structures extend for some distance in front of the former (and often to some extent posteriorly also). The resemblance between the larger and smaller mounds is very complete, and the latter are true gland-ducts and apparently nothing more. Above the lateral organ the densely papillate surface is limited by an irregular row of filiform papillæ extending posteriorly and superiorly beyond the lateral organ. These papillæ are probably tactile, and their position is constant in Marsupials (as far as I have observed), even in the absence of a lateral organ. The two anterior circumvallate papillæ are situated (11 mm. apart) at the level of the posterior end of the lateral organ. The posterior papilla is set very far forward in this species, so that the three are nearly in one straight line, the posterior angle being very obtuse. All that can be seen of the papillæ from the surface is a funnel-shaped depression (about 1 mm. across at the widest part), at the bottom of which the apex of the papilla can generally be detected, directed forwards (see fig. IV. Plate LIV. taken from the larger tongue). The opening leading into the involution containing the central papilla was entirely invisible from the surface, and the papilla was only discovered accidentally. The opening may be surrounded by a sphincter of smooth muscle; and it is probable that the central opening is not really smaller than the others, since the papillæ and the involutions are quite similar. A further proof of its contracted state was found in the folded condition of the inner surface. The coronate papillæ crowd closely upon the openings in the smaller tongue, but in the larger separate opening (fig. IV. Plate LIV.) they become less conspicuous posteriorly. Immediately round the openings there is an irregular ring of short simple papillæ (fig. XIX. Plate LIV., which also indicates the very constricted passage leading into the involution for the posterior papilla of the smaller tongue).

Minute Structure.—I. *Gustatory Structures.*

A. *The Circumvallate Papillæ.*—The remarkable shape and extreme protection of the papillæ is shown in fig. XIV. Plate LIV. The taste-bulbs are seen to be very numerous; there are over 30 tiers, and those round the central thickest part contain 80–90 in a single tier (see fig. XXI. Plate LV.). They are closely packed round the circumference, but there are generally one or two places in each section where they are absent, and they cover the whole surface of the papilla except a small part below the apex, which is the only unprotected region (see fig. XIV. Plate LIV.). There is I believe no doubt that the mouth of the depression can be closed upon the apex of the papilla, and that thus the delicate end-organs are completely protected. The mechanism for opening and closing is, however, very uncertain: smooth muscle-cells may be present in the mucosa parallel with and just outside the involution; such fibres would act as a dilating agency, aided by the contraction of other bands, which may also contain smooth muscle, and which radiate horizontally outwards from the thickened mucosa round the mouth. The closure of the mouth may be effected by a sphincter of smooth muscle-fibres, but in all these cases I cannot be certain as to the existence of the smooth muscle. By a different mechanism the papilla can be drawn downwards from below, and this action alone would tend to close the mouth. The dense mucosa (perhaps containing smooth muscle-cells) which lies outside the epithelium of the involution is invaginated into the papilla from below, forming a distinct layer in it (to be described). Inside the papilla smooth muscle-cells may exist in the invaginated mucosa. At the point where the mucosa bends round to enter the papilla many striated muscle-fibres terminate in it, their direction being vertical to the surface of the tongue. Any contraction of these fibres must draw down the papilla, and produce a tendency to close the mouth. It is possible, however, that the tension produced by contraction acts also upon the mucosa outside the involution, and thus tends to open the mouth. If this is the case it is probable that closure of the mouth is rendered a specially effective protection by the apex of the papilla being tightly clasped by the contracting orifice (the papilla being raised valve-like against the descending mouth by relaxation of the muscular contraction). Conversely the papilla may be drawn downwards from below, and the mouth opened by the same mechanism. It is only possible to decide by experiment as to which action really takes place. It is in favour of this view, that lateral compression of the fresh tongue causes a descent of the papilla and an opening of the mouth in the similar anterior papillæ of *Phalangista.* Glands of serous type are extremely abundant round these structures, and their ducts open into the space between the involution and the papilla, at all heights, and not especially round the base of the papilla (the rule in higher types).

The taste-bulbs are of the normal Marsupial type (as described in a paper upon "The Tongue of *Perameles nasuta*" by the present writer, in the 'Quarterly Journal of Microscopical Science' for January 1883), showing traces of their origin from the epithelial cells of an interpapillary process, in the indications of papillæ between the bulbs, and in the fact that the cells do not converge into a distinct basal pole. I was never able to detect indications of the protrusion of any structures through the gustatory pores. In order to be *certain* of the absence of such delicate processes (described in the higher mammals) the fresh tissue should be examined; but upon the whole I am inclined to think that such structures are absent from the bulbs of Marsupials, which are less specialized than those of the higher forms in the above-mentioned points. I have examined so many hundreds of distinct pores and bulbs with the cells apparently perfect, in so many species, that I believe some trace of these structures would have been detected if they were present. The gustatory pores are very short, only penetrating a thin superficial corneous lamina of the epithelium, which easily splits away from the rest. Very often the epithelial cells below the thin lamina split away with the latter, thus rendering the dome-like coverings of the taste-bulbs very distinct. The same layers tend to split away from the wall of the involution in which the papilla is contained. It is probable that the bulbs present a less marked separation than is met with in higher mammals, into peripheral protective cells and central cells which are nervous end-organs. But there is some indication of such a separation in the presence of two kinds of nuclei in the bulbs—the one spherical or oval, and the other greatly elongated. The latter must belong to the central cells. To be sure of this point, or indeed of anything in minute structure, the fresh tissue should be examined. Considering, however, that these structures in *Halmaturus* were not fresh, it would be hardly possible to have obtained tissues in better condition for minute examination. The question of the termination of nerves is better considered after the description of the layers within the papilla. These are shown in fig. XXI. Plate LV., which represents a transverse section through the thickest part of a papilla. In the axis are the nonmedullated nerves, which enter from below. They do not form any distinct ganglion in the papilla (as in *Perameles* and *Phalangista*). In a few cases isolated ganglion-cells were seen in the axis of the papilla, in one instance at some considerable height. It is probable that the ganglion-cells, which are always connected with the nerves of special sense, form small ganglia on the nerve-branches near the base of the papilla. The axial nerves are supported by trabeculæ from the next layer, and large blood-vessels are present, entering with the nerves. The next layer, already mentioned, is derived from the dense mucosa, and is composed of fibrous and possibly smooth muscular elements. Blood-vessels are present in it; and nerve-branches passing from the axial nerves to the subepithelial layer may be seen streaming outward through it. The next subepithelial layer is characteristic, not occurring elsewhere. It represents the unravelled elements of the two other layers united into interpenetrating networks. The importance of the layer is well seen by looking at the tissues underlying the ordinary epithelium, after looking at that beneath the bulbs. Below the limits of the taste-bulbs the subepithelial layer thins away abruptly, but its connective-tissue elements are probably continuous with a delicate layer which lies between the deeper denser part of the mucosa and the lowest layer of the epithelium on the outside of the involution. The subepithelial layer disappears less rapidly above the limits of the bulbs, and in some places its fine fibrils end against the lowest epithelial cells. This is seen with especial clearness in the cells of interpapillary processes; and it may be that bulbs are arising directly in this region, or (as is more probable) that these masses of epithelial cells with the appearance of nerve-terminations in them represent bulbs that have degenerated into the structures from which they originally arose. This, however, is merely a suggestion. Capillaries are present in this layer. At certain places the subepithelial layer is converted into a tissue resembling adenoid tissue, which may also invade the layer last described, sometimes even reaching the axial nerves. A similar tissue has been described in a corresponding position in the tongue of *Ornithorhynchus* (see paper on this subject by the present writer in the 'Quarterly Journal of Microscopical Science' for July 1883). When the subepithelial layer is studied under high powers ($\frac{1}{18}$ oil-immersion of Zeiss), fine fibrils are seen to terminate abruptly against the contour of the convex lower surface of the bulb, separated only from the cells by the linear (even under this power) basement membrane. The fibrils often expand at their termination, becoming funnel-shaped. Such appearances are observed over the whole proximal surface of the bulb and not merely at its centre. It was really impossible to be certain in the identification of these fibrils as nervous, and yet there are some fibrils which can be considered nervous with a very high degree of probability. These are distinct under comparatively low powers as sharply defined dark fibrils that pass straight through this layer from the fibrous layer towards the taste-bulbs. These fibrils confer a radiate appearance upon the subepithelial layer (see fig. XXI. Plate LV.). Round or oval, deeply-staining nuclei are very characteristic of this layer, and are obviously related to the nervous elements, as they are almost completely limited to the region of the end-organs. These nuclei belong to small multipolar cells continuous with some strands of the network ; but it seems more probable that they belong to a special supporting connective tissue (such as the neuroglia) than that they are nervous. This subepithelial layer bears a strong resemblance to certain retinal layers, and is probably identical in structure (both consisting essentially of the unravelled elements of supporting and nervous tissues arranged in fine interpenetrating networks, as has been mentioned).

These layers and their relation are better seen in longitudinal than in transverse sections of the papilla (see fig. XX. Plate LIV., which shows the same arrangement in *Phalangista*).

B. *The Lateral Gustatory Organs.*—When a section is taken at right angles to the long axis of one of the depressions (upon one of the elevations previously described), the latter is seen to be the mouth of a narrow chink which is obviously the duct of a gland (see fig. XXXI. Plate LV.), in the epithelial walls of which a few taste-bulbs have been developed. The lateral ducts sometimes open into the chink above the taste-bulbs, and below the points where the latter occur the main duct breaks up into smaller tubes. Horizontal sections show that the narrow ducts into which the depressions open are always slit-like, although the latter may appear to be circular, and the long axis of the slit is always at right angles to the inferior limit of the papillate surface above. In this respect the primitive lateral structures of *Halmaturus* are similar to the furrows of the lateral organ in higher animals. Although the bulbs are scattered irregularly in vertical sections, their arrangement is much more even in sections taken horizontally. It is therefore probable that the real arrangement is in regular tiers, but that the tiers themselves do not follow one another regularly. The subepithelial layer is not strongly developed beneath these bulbs, but traces of it can be distinguished. The nerves approach the bulbs from the sides, running horizontally beneath the epithelium for a considerable distance. Ganglion-cells are very numerous in little groups on the nerves. The cells are enclosed in distinct nucleated capsules. The glands into which the ducts of the lateral organs lead are of course serous. The smaller gland-ducts which open below and in front of the lateral organs (see fig. I. &c. Plate LIV.) lead down deeply into mucous glands, although some of the lobules appear to be serous. No bulbs are present in the walls of these ducts. The epithelium round the lateral organs (and that of all the non-papillate surface I examined) is of the dense complex kind, similar to that described in the tongue of *Ornithorhynchus* (in the paper previously referred to). In such an epithelium four distinct layers can be made out. By far the thickest of these is the lowest layer, which presents all the characters of the rete Malpighii, staining deeply below, slightly above; over this is a thin layer of cells that stain deeply in most reagents, and possess very long thin nuclei (in vertical sections): above this is a layer of about equal thickness, behaving toward reagents in the same manner as corneous cells; this again is followed by a thicker, deeply staining layer of fusiform cells with distinct elongated nuclei. The remarkable thing about this epithelium (as was pointed out in describing the tongue of *Ornithorhynchus*) is that, in upward succession, cells presenting the characters of a corneous layer should again come to present the characters of non-corneous epithelium (see fig. XXXI. Plate LV.). A hair was seen in one section of a lateral organ; and probably due to the irritation caused by it, the mucosa beneath was crowded with large deeply staining cells.

C. *Fungiform Papillæ.*—The same imperfect type of bulb is seen on the summit of these papillæ that has been described in the same situation in *Perameles* (paper previously mentioned). Such bulbs show more distinct traces of their origin from interpapillary epithelial cells than those in any other part of the tongue. Their appearance upon these papillæ is probably very recent, and it is noteworthy that this is the only instance of their occurrence without the immediate proximity of serous glands. Large non-medullated nerves are found in the axis of the papilla. Beneath the bulbs the subepithelial layer is distinct. Gustatory pores are present, and as many as six bulbs can be seen in a single section of one papilla. It is not unlikely that these papillæ are tactile (they are tactile in *Ornithorhynchus*, and if gustatory here, the change is recent).

II. *Mechanical and Tactile Structures.*

A. *The Coronate Papillæ.*—These are of the usual Marsupial type, much resembling the same papillæ in *Perameles* (described in the paper alluded to). Horizontal sections at successively higher levels show that the main papillary upgrowth is at first irregular in shape, then horseshoe-shaped (the concavity anterior) with the arms gradually breaking up into the separate papillary upgrowths for the secondary papillæ. Hence the posterior side of any such section can be known at a glance, because here the secondary processes arise at a higher level, and therefore some of them have not yet separated from the main upgrowth. (See fig. XXVIII. Plate LV.) If the section is taken sufficiently high to show a complete ring of secondary papillary processes, it is still easy to know the posterior side, because posteriorly the processes are cut through at a lower level. (This is rendered clear by fig. XXVI. Plate LV., which shows a single coronate papilla of *Macropus* in perspective.)

The ring of secondary papillæ is less regular in *Halmaturus* than in *Perameles* &c., and it is common to find single papillæ *within* the ring (*i.h.p.*, fig. XXVIII. Plate LV.). Between the coronate papillæ isolated hair-like papillæ are common, rising singly from the epithelium. In all respects these resemble the hair-like papillæ of the coronate rings. (They are shown in fig. XXVIII. Plate LV., *s.h.p.*, and in vertical section in fig. XXVII. Plate LV., *s.h.p.*) These isolated slender papillæ with no tendency to coalesce into rings are very characteristic in tongues which in other respects also show traces of more primitive affinities than those of other Marsupials. (The posterior part of the tongue of *Ornithorhynchus* is covered with closely set single hair-like papillæ, very much resembling the papillæ here described, and agreeing in the important point that each hair-like papilla possesses but a simple papillary upgrowth.) The coronate papillæ are of large size, and there are only about 10 to the square millimetre close to the posterior circumvallate papilla. A little anteriorly (by the anterior circumvallate papillæ) they become rather smaller, and I counted 12 to the square millimetre.

In ascending from the smooth to the papillate surface, the long papillary processes of the former first bear simple papillæ; these form an irregular row (one or two deep, and sometimes absent) and then coalesce into the coronate papillæ. There are a few of these simple papillæ, bent upwards so as to be almost parallel with the surface of the tongue, below the lateral organ in some sections. The coronate secondary papillæ curve upwards from the sides towards the middle of the tongue (see fig. XXIX. Plate LV.); but this is not so marked as in *Phalangista,* at any rate in the posterior part of the tongue. The secondary papillæ of the upper surface are curved backwards; but this is very slightly marked posteriorly, where the coronate papillæ are tall and slender; while anteriorly (in the piece of tongue in my possession) they become shorter, stouter, and the hair-like secondary papillæ much recurved (see fig. XXVII. Plate LV.). The epithelium is immensely thickened in passing from the smooth into the papillate region (see fig. XXXI. Plate LV., *s.e.*, where the transition is taking place, and compare the thickness with the less magnified fig. XXVII. Plate LV., which is taken in the middle line of the papillate surface). Although the epithelium changes in thickness, the four layers of the complex epithelium can be detected in it and enter into the coronate papillæ. This is best shown near the transition. (See fig. XXIX. Plate LV., which represents diagrammatically the arrangement of the four layers in a single coronate papilla close to and above the lateral organ. The section is of course vertical and transverse, and the curve of the secondary papillary processes is upwards. The layers correspond to those in fig. XXXI. Plate LV. In other parts of the papillate surface the distribution of the corneous layer (2) would be more symmetrical upon the secondary papillæ.) We thus have a proof that the layer (2) previously described is truly corneous, inasmuch as in these fine processes, of mechanical use, it rises to the surface and is confined to the effective side, or both sides where both are effective. The very granular cells which in many other Marsupial tongues (*Perameles* &c.) form the transition into the upper corneous layer are slightly marked here. It is very likely that the transition described through the complex layers takes the place of the other method. There are, however, some finely granular cells in layer (4). The complex epithelium ends at the entrance into the involution for the circumvallate papillæ in the same way as at the mouths of the lateral organ (see fig. XXXI. Plate LV.).

B. *The Filiform Papillæ*, forming the limits of the papillate surface above and behind the lateral organ, are probably tactile in function. They are of small size for so large a tongue. They are similar to those described in *Phalangista*.

Thus in many points connected with the tongue, *Halmaturus* is the most primitive Marsupial yet examined—in the very primitive lateral organ, in the extremely protected circumvallate papillæ with bulbs nearly covering them, and in the irregular coronate papillæ and the existence of scattered hair-like papillæ between the latter, with no apparent tendency towards coalescence into rings.

THE TONGUE OF *Macropus melanops*.

This tongue had been kept in spirit, and the tissues were not in a condition for minute examination; but many points of interest could be ascertained. The pieces of the tongue from which I intended to make sections I placed in spirit, gradually increasing the strength until they were finally placed in absolute alcohol, and were cut after remaining some little time in this fluid.

General description.—The appearance of the tongue from above is shown in fig. VI. Plate LIV. (half natural size). This organ is evidently closely related to that of *Halmaturus*. The circumvallate papillæ are arranged as usual, the posterior angle being exceptionally obtuse, although not to the same extent as in *Halmaturus*. As in the latter animal, the depressions leading into the cavities containing the papillæ are alone visible from the surface and are very inconspicuous. The lateral organ (fig. VII. Plate LIV., natural size) also resembles that of *Halmaturus*; but the mound-like elevations are arranged in a regular curve, and the depressions have more of the normal appearance. Independent mucous glands cannot be seen in this specimen, but they may be present; filiform papillæ are arranged above the lateral organ. The fungiform papillæ are very abundant all along and just above the edge where the papillate joins the non-papillate surface. At the tip the junction is beneath the tongue and forms a line parallel with the contour (see fig. V. Plate LIV., natural size). On this papillate surface beneath the tip fungiform papillæ are extremely abundant, and many of them are unusually large. There is little doubt that papillæ in this position are tactile. The free part of the tongue is about 60 mm. long, and there is a raphe detectable for about 80 mm. from the tip backwards. The inferior median ridge is low and wide, and the lateral grooves shallow (see fig. V. Plate LIV.).

Minute Structure.—I. *Gustatory Structures.*

A. *The Circumvallate Papillæ.*—All three are probably similar in structure, and seem to be intermediate between the *Halmaturus* type (fig. xiv. Plate LIV.) and the higher form approaching radial symmetry. The symmetry here is, I believe, decidedly bilateral, the papillæ distinctly directed forwards, and the protection extreme; but in none of these points do the papillæ equal those of *Halmaturus*. There were some indications that the posterior papilla is less inclined than the anterior, but I am not certain that the appearance is genuine. The posterior involution is also surrounded by a prominent rim with papillæ upon it. Nothing could be ascertained as to nerve-cells in the papillæ. I could not decide as to the height to which the bulbs extend on the papillæ—probably up to the point at which the sides begin to slope sharply inwards to form the summit, which seems to end in a simply pointed apex. The base of the papillæ seems to be invaded by glandular tissue.

B. *The Lateral Gustatory Organs.*—These are much the same as in *Halmaturus*, but are more advanced; they do not obviously represent gland-ducts, but suggest depressions into which the latter enter. The mounds on which the furrows open are more prominent than in *Halmaturus*.

C. *The Fungiform Papillæ.*—These papillæ contain bulbs and are richly supplied with nerves. The epithelium below the tip is smooth, but probably tactile from the abundance of nerves beneath it. I could not distinguish any difference between the large and small papillæ of the tip, or between the papillæ of the tip and those situated posteriorly. I should like to work at this point again with specially prepared material.

II. *Mechanical and Tactile Structures.*

A. *The Coronate Papillæ.*—On the upper surface of the tip horizontal sections prove that there are generally 9–12 secondary papillæ forming an anterior horseshoe, and a single large posterior papilla, indicating the beginning of that peculiar modification of the coronate type which reaches its culmination in *Didelphys*. This posterior papilla is especially cornified, and its base tends to pass forward as two horns; it is broad at the base, pointed above, and it must be concave from side to side anteriorly. Its papillary upgrowth is very large and triangular, the angles tending to pass anteriorly with the horns. The coronate papillæ of this part of the tongue very much resemble the transitional forms that pass into the strongly marked region of *Didelphys*. The coronate papillæ are oval antero-posteriorly. In the anterior horseshoe there are occasional irregularities, but isolated hair-like papillæ are absent in this part of the organ. Vertical longitudinal sections confirm the conclusion derived from a study of horizontal sections. There are about eleven papillæ to the square millimetre.

Midway between the tip of the tongue and the anterior circumvallate papillæ, the isolated hair-like papillæ are very abundant.

The coronate papillæ are generally circular and very large (about five to the square millimetre); they are not closely packed as in the region to be next described. The posterior side can be recognized by the same character that it presents in the papillæ of the tip. There are generally 6–8 secondary papillæ in the anterior horseshoe; the arrangement is occasionally irregular.

Between the anterior circumvallate papillæ there are no isolated hair-like papillæ. The coronate papillæ possess very complete rings of secondary papillæ (13–17 are the common numbers, and 17 is not at all uncommon). The rings are very symmetrical, and the posterior side is not much marked, though generally recognizable by the higher level at which the secondary papillæ arise.

The coronate papillæ are generally circular and are very closely packed (about seven to the square millimetre). In one section the papillæ were about ·375 mm. in diameter, and the spaces between them from ·075–·025 in width, and most frequently the latter. Longitudinal vertical sections show that the coronate papillæ in this region are beautiful and tall, with their hair-like papillæ slightly recurved at the tip (see fig. XXVI. × 14·5, Plate LV., which shows one of these papillæ in perspective). They are over 2 mm. in height (from the top of a perfect secondary papilla to the surface of the superficial epithelium of the tongue). The upper cells of the main papilla stain deeply like those of *Perameles* and many other Marsupials.

B. *The Filiform Papillæ.*—Probably normal in structure, but no minute investigation was possible.

Thus this tongue decidedly follows the type of *Halmaturus*, but it shows an advance in all the points which the two have in common.

THE TONGUE OF *Petrogale xanthopus.*

I have recently received a fresh specimen of this tongue, so that I am able to add a general description. The whole tongue is strikingly similar to *Macropus*, and, like it, follows the type of *Halmaturus*. The circumvallate papillæ are arranged in a similar triangle (the posterior angle being very obtuse), and nothing can be seen from the surface except the orifices of the involutions. The posterior papilla appears to be rather different from the anterior, the entrance being extremely small (probably contracted), and lies in the centre of a raised subcircular area, of which the surface is smooth. The anterior openings are larger (probably less contracted), and the raised area is less distinct. The fungiform papillæ are arranged as in *Macropus*, along the sides and tip, where some of them are larger; a few are scattered on the upper surface, and these may also be present in *Macropus* in the fresh state. The lateral organ is not arranged in the segment of a circle (as in *Macropus*), but apparently forms an irregular line of openings which are not raised upon elevations. The line is of considerable length, and the depressions are separated by more than the usual interval. The openings were very contracted, and could hardly be made out on the left side. No gland-ducts were visible. The raphe, inferior median ridge and grooves, and the arrangement of the coronate papillæ are all exactly as in *Macropus*.

Obviously this organ is very close to that of *Macropus*.

THE TONGUE OF *Dasyurus maugæi*.

Quite recently I received a fresh tongue of this species; and I am very glad to be able to add the general description, because until now I have not had the opportunity of investigating this organ in any of the Marsupialia Sarcophaga, and I felt uncertain as to whether the previous observations (such as the existence of coronate papillæ) would hold. I was also much interested in ascertaining whether the organ was much modified by the very distinct change of habits, and in determining the relative resemblance of this organ to the other various types.

The shape was not remarkable, the tip being simply rounded as seen from above and forming a rather sharp edge. The junction between the papillate and non-papillate surfaces was sharp and even; the ridge and grooves as usual. There is a slight trace of a median raphe. The circumvallate papillæ form the usual triangle, which is here fairly equilateral, but the sides are a little shorter than the base. The papillæ seem to be bilaterally symmetrical, and their tall pointed apices are *directed backwards*. If this is the condition in the living state, it is unique as far as I have yet observed. The posterior papilla seems to be a little larger than the others. They are all studded with small protuberances (secondary papillæ) on the anterior side of the lowest part visible. The upper recurved part exactly resembles a large filiform papilla, and as these are common round the circumvallate papillæ, the suggestion arises that the available (otherwise unused) surface of the latter has been modified into the former. There seems to be no trace of a lateral organ. The fungiform papillæ are distributed as usual, extending round the tip and scattered over the whole upper surface in considerable abundance. The filiform papillæ are long and also flap-like; they are continued backwards and upwards from the usual position on to the area of the circumvallate papillæ, as has been previously described in *Perameles*. Posteriorly the coronate papillæ seem to be transitional into the filiform papillæ by a relative increase in the posterior secondary papilla and a gradual disappearance of the rest of the ring (also noticed in *Perameles* and the same general tendency in many forms). The coronate papillæ seem to be well developed and of normal structure over the whole of the upper surface. Of course this can only be rendered certain by sections. Posteriorly in the middle line, just in front of the anterior circumvallate papillæ, it appears that the secondary papillæ are much shortened, but traces of them can be made out.

Thus upon the whole this tongue comes nearest to the *Halmaturus* type, in the possession of three bilaterally symmetrical circumvallate papillæ. But this conclusion is not certain, and may be much modified by sections. The tongue is typically Marsupial in the possession of coronate papillæ, &c.

THE TONGUE OF *Phalangista vulpina.*

I was fortunate enough to obtain two specimens of this organ—the back part of one (given me by Professor Moseley) and a fresh and complete tongue taken from an animal which I procured last Easter (1883). The back part of the tongue had been hardened in chromic acid and afterwards in spirit, while the whole tongue was hardened in a gradually strengthened mixture of chromic acid and spirit, the hardening being completed in spirit.

General description.—The back part of the tongue (Professor Moseley's) as seen from above is shown in fig. VIII. Plate LIV. (natural size), and from the right side in fig. IX. Plate LIV. (natural size). The posterior circumvallate papilla is seen to be large and radially symmetrical; it is not highly protected (as in *Halmaturus* &c.), and exposes a large circular disk (its summit) to a surface view, as in the higher mammals; it is situated far back from the anterior papillæ so that the posterior angle is acute. The anterior papillæ are smaller, concealed from view (except their apices), bilaterally symmetrical, and directed forwards as in *Halmaturus* &c. There is a well-developed lateral organ visible from above and from the sides (shown in both figures); it presents a great advance upon the same structure in *Halmaturus*, and yet even here the attention is solely directed to the slit-like depressions as the only essential organ. In the highest form of lateral organ (as in some Rodents) the surface between and around the slits undergoes modification, producing a foliate papilla in which the attention is directed to the lamellæ or ridges with bulbs on their sides, the intervening furrows appearing quite subordinate as merely the necessary spaces between the ridges. However, in such a tongue as that of *Phalangista* it is seen that the furrows are primary and the development of the ridges quite secondary. Many of the higher animals have the same simple type of lateral organ. The fungiform papillæ occur along the sides and probably on the upper surface. The filiform papillæ have the usual distribution; they are pointed, and very frequently of the triangular flap-like shape. Sometimes a papilla of the latter shape divides into two or three secondary papillæ. The whole surface is densely covered with coronate papillæ. The complete tongue enabled me to ascertain the true size:—length 63 mm. from the tip to the epiglottis; width at the level of the anterior circumvallate papillæ 18·25 mm. The tip had a rounded margin; the median ridge and grooves as usual. The free part of the tongue was 21·5 mm. in length.

Minute Structure.—I. *Gustatory Structures.*

A. *The Circumvallate Papillæ.*—The posterior papillæ were radially symmetrical and the anterior bilaterally symmetrical. The posterior and anterior papillæ of the complete tongue are shown in figs. XX. and

XVI. (Plate LIV.) respectively. Glands are very numerous (as they seem to be in connection with the circumvallate papillæ of all Marsupials), as many as seven ducts being seen in one vertical section (of an anterior papilla); they open at all levels into the involution (see figs. XVI. and XX. Plate LIV.). Peripherally the serous glands are replaced by mucous glands, although the latter are very abundant and sometimes even enter the papillary body. The mucous glands open upon the surface of the organ. In the larger posterior papilla the central nervous mass is ganglion-like (as in *Perameles*, though not to an equal extent), and nerve-cells occur high up in the papilla, and in still greater abundance in an axial downward extension of the central nervous tissues (see fig. XX. Plate LIV.). This condition was not equally well marked (although present) in the incomplete tongue; and nerve-cells were not detected in any of the anterior papillæ, although they occur in nerves at the base and the downward extensions are present. In all the papillæ of both tongues the dense mucosa beneath the epithelium of the involution is reflected upwards into the papilla, and there forms a protective layer encircling the axial nervous mass (see fig. XX. Plate LIV.). In fact this arrangement is exactly as in *Halmaturus*, with the same subepithelial layer &c. (compare fig. XXI. Plate LV.). Striated muscles terminate in the dense mucosa at the point at which it curves round to enter the papilla (fig. XX. Plate LIV.). The various possibilities as to the action of these muscles have been discussed (*Halmaturus*). Here also it is possible that smooth muscle-fibres exist.

The arguments apply with greater force to the anterior papillæ, for their shape at once suggests that the mouth of the involution can be closed.

There appear to be 1100–1200 bulbs to the square millimetre on these papillæ and the grooves of the lateral organ.

The space between the papilla and its involution and the gland-ducts were often filled with a deeply-staining coagulum in the incomplete tongue; it was probably a constituent of the secretion of the serous glands acted upon by the hardening reagents. There had also been a distinct discharge of a fluid substance from the gustatory pores into this coagulum, in the form of small globules often still connected with the pore by a narrow neck; the globules were distinct from the coagulum, as they remained unstained.

The inferior convexities of the taste-bulbs are prominent and distinct, without any of the filling-in between the bulbs that occurs in higher animals. The bulbs still resemble interpapillary processes. The pores are very short.

B. *The Lateral Gustatory Organ.*—Vertical sections show that the downward direction of the furrows is as irregular as their surface view (see fig. XXXII. Plate LV.). The serous glands are very abundant, opening at the bottom of the trenches. In one vertical section three ducts were seen. At the sides the serous glands are replaced by mucous glands which open freely on the surface, but never, as far as I observed, into the furrows. Nerves are abundant, and commonly contain nerve-cells collected in small ganglia; they approach the organs as in *Halmaturus* (running beneath the epithelium of the general surface). The bulbs are found on the sides of the furrows in about 7–10 tiers, extending right up to the lips of the opening. Beneath the bulbs there is also the same delicate subepithelial layer that exists in the circumvallate papillæ; there is also the same dense mucosa with striated muscle-fibres terminating in it. (This is a character of the whole organ, and the possible significance suggested above is a result of its greater relative predominance in that particular region.)

C. *The Fungiform Papillæ.*—As described above, I include these structures under the present head because of the existence of bulbs in them; but I believe that they are essentially tactile, and it has to be proved that they are gustatory in any case. The bulbs are of the same primitive type described in this position in *Perameles.* The bulbs are evidently a very recent development in the fungiform papillæ of Marsupials.

II. *Mechanical and Tactile Structures.*

A. *The Coronate Papillæ.*—Over much of the surface of the organ there is no very distinct backward sweep of the secondary papillæ, but a very decided curve inwards and upwards, even carried to the middle line. Anteriorly the backward curve is followed. The coronate papillæ do not seem to give way (by transition) to any other type at the limit of the area on which they occur; they simply become less distinct, their rings of papillæ becoming isolated as a few scattered points. There are about 31 coronate papillæ to the square millimetre just in front of the anterior circumvallate papillæ. There are 8–15 papillæ in the rings. The coronate papillæ are circular. Occasionally a secondary papilla is placed within the ring, but such irregularity is not common. The shape of these papillæ is exactly like those described as the anterior type of *Perameles,* the succession of cells being very similar (see paper referred to, p. 599). Just above the tip, and on the tip itself, there appear to be 11–12 papillæ in the rings, and here there are only 20 main papillæ to the square millimetre. They are oval in shape, and ·275 mm. in length and ·175 mm. in breadth. The posterior secondary papillæ are much developed (fig. xxx. Plate LV.). The upward succession of cells is very complicated in these papillæ, even more so than that of *Perameles.* The succession is shown in fig. xxx. (Plate LV.).

B. *The Filiform Papillæ.*—These are probably tactile, as nerve-fibres are very abundant close to and in them (with many nerve-cells in the nerves about their bases). The epithelium is not cornified, and (in common with the papillæ in this position in all Marsupials) their function cannot be mechanical. It is probable that the nerve-endings are of the most delicate intraepithelial kind, and therefore invisible except by special treatment of the fresh specimen. Mucous glands are very abundant near these papillæ, the ducts often opening beneath them.

Thus this tongue commences a new type, chiefly characterized by the possession of two anterior circumvallate papillæ, following *Halmaturus*, and a posterior papilla much resembling that of higher animals.

THE TONGUE OF *Belideus breviceps*.

This specimen had been preserved in spirit, and although unsuitable for minute work I was able to make out a great many interesting points. The hardening was conducted as in *Macropus*.

General description.—The size and shape of the organ, as seen from above, are shown in fig. x. Plate LIV. (natural size). The tip of the tongue had been injured by the teeth of the animal and was bent down so as to be invisible from above; but I think that this is accidental, and have taken this view in the drawing. The contour of the tip of the tongue in *Acrobates* bears out this view. The posterior circumvallate papilla is large and radially symmetrical, showing a large circular area on the surface; the two anterior papillæ are not radially symmetrical, and are nearly hidden from view in narrow, slit-like, oblique depressions. Thus the arrangement is an exaggeration of that met with in *Phalangista* (compare figs. VIII. and X. Plate LIV.). The filiform papillæ are normal in appearance and position. There is a lateral organ just below the bases of the anterior filiform papillæ, invisible from above. Four or five grooves are present, which are very small and recognizable with difficulty. The free part of the tongue appears to be about 11 mm. long. There is a sharp inferior median ridge with the two grooves.

Minute Structure.—I. *Gustatory Structures.*

A. *Circumvallate Papillæ.*—The posterior papilla resembles that of *Perameles* in possessing a ganglion within it, which is not prolonged into the base as in *Phalangista*. Nerve-cells are very numerous in the axis of the base, extending upwards for half the height of the papilla. The summit of the papilla is beset with small secondary papillæ, thus resembling *Phalangista* rather than *Perameles*, but the whole shape more resembles the latter (compare figs. XVII. and XVIII. Plate LIV.). The papilla is certainly radially symmetrical, and the irregularity shown in fig. XVII. is due to contraction. There are traces of a raised ridge round the papilla as in *Perameles*. Striated muscle-fibres terminate beneath the papillæ, as has been described in *Phalangista* and *Halmaturus*. This is also true of the anterior papillæ, which bend inwards and probably forwards as well (see fig. XV. Plate LIV., and compare with fig. XVIII.), so that they are bilaterally symmetrical taken together, but not singly. They are extremely different from the posterior papilla. There appear to be 5–8 tiers of bulbs. Nerve-cells can sometimes be detected in the nerves at the base of the papillæ. The relations of the striated muscle and the supporting framework of the papilla are as in *Phalangista*.

B. *Lateral Gustatory Organ.*—The appearance, position, and apparently the structure are as in *Phalangista*. There are the same serous glands connected with the grooves, and the same distal mucous glands. The grooves are similar in being less regular than in higher mammals. Sometimes there are patches of adenoid tissue close beneath the bulbs. Sometimes, even here, there is a slight rising to the lips of an opening, just suggesting the mouth of a gland. There are the usual nerve-cells in the nerves going to the bulbs. The bulbs seemed few and irregularly placed in the furrows, but this may be due to change in the tissue.

C. *The Fungiform Papillæ.*—Nothing could be made of their structure, but they are almost certainly similar to those of other marsupials (e. g. *Phalangista*).

II. *Mechanical and Tactile Structures.*

A. *The Coronate Papillæ.*—These papillæ are often oval just above the tip, the long axis being directed antero-posteriorly. It is common to find 8–10 secondary papillæ in the rings. I calculated that there are rather under 40 papillæ to the square millimetre. I could not find any isolated hair-like papillæ in the tongue. The papillæ are much recurved anteriorly, especially at the tip, where vertical sections seem to indicate a modification of the usual structure; but this part was much altered. Horizontal sections, taken posteriorly just in front of the anterior circumvallate papillæ in the middle line, show rather irregular rings of secondary papillæ, as in *Phalangista*; the common number in a ring seems to be 8–10. When crowding or irregularity occurs, it is at the anterior side of a ring. There are about 37 papillæ to the square millimetre. The upper cells of the main papillæ stain deeply, exactly as described in *Perameles* (see paper above noticed). The curvature of the secondary papillæ becomes less posteriorly, and over a large region only the tips are recurved, the papillæ being tall and slender and very beautiful. Again posteriorly they become recurved. (See fig. XXVI. Plate LV., which represents a similar papilla of *Macropus.*) The non-papillate epithelium at the side of the organ is smooth and without papillary upgrowths; it appears to be simple. The transition into the coronate papillæ is sudden, and the latter curve inwards as well as backwards, the inward curve being especially marked towards the middle line, but outside this rather irregularly. Behind the limits of the coronate papillæ on the upper surface the epithelium becomes smooth, and there are some indications of complexity.

B. *The Filiform Papillæ.*—Nothing could be made out certainly, but their shape and position indicate that they are normal in other respects.

This tongue is very close to *Phalangista*.

THE TONGUE OF *Acrobates pygmæus*.

I am only able to give a general description of this interesting little tongue (the species is the "Opossum Mouse," the smallest marsupial). There is the most remarkable difference in size between the anterior and posterior circumvallate papillæ. The posterior is very large and shows perfect radial symmetry, exactly resembling the ordinary papillæ of higher mammals as seen from the surface; it is placed some distance behind the anterior papillæ, as in *Belideus* &c. The anterior papillæ are small, but quite distinguishable from above; they seem to retain very little (if any) bilateral symmetry and forward direction. To be certain on this point, sections are necessary. The great development of the posterior papillæ in Marsupials, where there is any difference between the three, compares in an interesting manner with the condition of many higher mammals. In these latter it is quite common (*e. g.* in many Insectivora &c., &c.) for the posterior papilla of the triangle to be altogether lost, and for the tongue only to possess two papillæ on the same level; these two obviously represent the anterior papillæ, for in allied species (*e. g.* the Hedgehog among Insectivora) the triangle is complete. The three circumvallate papillæ of *Acrobates* are placed on a depressed smooth area at the back of the tongue. Immediately anterior to the two foremost papillæ the coronate surface begins with a sudden transverse rise right across the tongue, thus sheltering the circumvallate structures. There is a distinct normally placed lateral organ beneath the filiform papillæ, which is interesting in its possession of only two furrows (as far as I can tell from surface examination); these are distinct and well developed, and surrounded by prominent lips. The coronate papillæ are as abundant as usual and have the ordinary arrangement. Fungiform papillæ are very common on the upper surface as well as on the sides.

On the underside of the free part the ridge and grooves are normal. The pointed tip of the organ is not turned down, suggesting that the figure of *Belideus* (fig. x. Plate LIV.) is correct. It is extremely interesting that (as in the young marsupials and in Cetacea) the epiglottis can be made to protrude through a notch in the soft palate, so that breathing can go on uninterruptedly during the time that the animal is drinking the sweet juices of the flowers of *Eucalypti*, which constitute its food. The epiglottis is long and tubular, and its opening is prolonged into a slit posteriorly, so that it must be a great protection at all times, and a perfect protection when it is thrust through the notch, as I found it in this specimen.

The soft palate is continuous with the pharynx laterally for a long distance backwards; its free edge is a deep mesial notch, of which the anterior convex edge is just over the tubular epiglottis, and of a size and shape that the latter fits completely. The fluids (as in other cases) must pass on each side of the epiglottis.

This tongue obviously belongs to the *Phalangista* and *Belideus* type, and is a more complete specialization in the same direction than is met with in these latter.

THE TONGUE OF *Perameles nasuta*.

I have already described the general appearance and histological details of this tongue in the 'Quarterly Journal of Microscopical

Science' for January 1883. I will shortly recapitulate the main features to show the relations to the other tongues described in this paper. I received from Professor Moseley the back part of the organ. The three circumvallate papillæ (see fig. xviii. Plate LIV.) are very large (for so small a tongue) and resemble one another; they are radially symmetrical, only differing from those of higher mammals in their constricted bases and in the primitive type of bulb always present in Marsupials. They present a large circular area to a surface view (as in *Didelphys*, the posterior papilla of *Phalangista* &c., and in higher mammals). There is no lateral organ. The fungiform papillæ are scattered over the surface, but especially distributed along the sides; they contain more primitive bulbs than the circumvallate papillæ. The filiform papillæ are generally long and pointed, and they extend from the usual position, upwards and backwards, to the circumvallate papillary region. The coronate papillæ are normal.

Thus the tongue comes nearest to that of *Didelphys* (as far as this form could be investigated), and with the latter is the nearest approach to the structure of this organ in the higher mammals. It again begins a new type, characterized chiefly by the possession of three similar radially symmetrical circumvallate papillæ.

The Tongue of *Didelphys quica*.

The specimen had been preserved in spirit and the minute structures could not be made out; but some important points were ascertained, especially concerning the coronate papillæ, which were not much altered. The general description of the organ is also probably accurate in nearly all points. I used the same methods of hardening that were adopted with *Macropus*. I was extremely interested to observe how far the American form would follow the marsupial type as regards the coronate papillæ.

General description.—The size and appearance of the tongue, as seen from above, are shown in fig. xi. Plate LIV. (natural size). The transverse grooves crossing the organ in front of the circumvallate papillæ are probably due to contraction. The tip was injured, and I am not certain that it possessed an even contour as it is drawn. There were some indications of a division into lobe-like papillæ or processes, but I cannot be sure of this. The three similar circumvallate papillæ are round and large, resembling those of *Perameles* (see paper above referred to), but not so large in comparison with the size of the tongue. As seen from above they (together with those of *Perameles*) resemble the circumvallate papillæ in higher animals, in their radial symmetry and the size of the circular area exposed. There is a very even (though short) row of large upward and inward curving filiform papillæ in the usual position, but I could detect no traces of a lateral organ. The fungiform papillæ were not well preserved, but a few large ones are seen in the usual place. The junction of the papillate and non-papillate surfaces is sharp, but the latter is slightly rough. The coronate papillæ, covering a patch some little distance behind the tip, are very strongly developed and of a remarkable structure. The powerful horny hooks characteristic of this region are distinct to the naked eye. The free part of the tongue is 19 mm. long (nearly half the total length), and the median ridge below is sharp and the grooves deep.

Minute Structure.—I. *Gustatory Structures.*

A. *The Circumvallate Papillæ.*—The transverse sections show that the circumvallate papillæ resemble those of *Perameles* (see fig. XVIII. Plate LIV.) in their constricted bases. Nerve-cells are abundant in the nerves at the base and probably within the papilla also. The minute structure could not be made out, but I saw some indications of peculiarity in the bulbs and their arrangement. There was an appearance of terminal organs in the papillary processes above the usual limits of the bulbs. The bulbs also seemed to be papillary in position, and were very unusual in appearance. I did not see gustatory pores, but it is most likely that they are present. The above suggestions of peculiarity may be entirely dissipated by the examination of a specimen prepared for histological work. Comparison with the state of the bulbs in *Belideus* leads me to believe that the peculiarities are not genuine structures, except perhaps the terminal organs outside the region of bulbs. I give no figure because the papillæ were much shrunk. Provisionally these papillæ may be regarded as close to those of *Perameles*, from their general shape.

B. *The Fungiform Papillæ.*—Nothing could be made of the minute structure. The shape, size, and position being normal, it is likely that the structure is also normal.

II. *Mechanical and Tactile Structures.*

A. *The Coronate Papillæ.*—The strongly developed papillæ (fig. XI. *s.c.p.*, Plate LIV.) of the patch behind the tip were shown by horizontal sections to be remarkably modified forms of the normal coronate papilla (see fig. XXIII. Plate LV.). The posterior secondary papillæ seem to be fused into a single strong recurved horny hook. In other parts of the circle, the secondary papillæ are normal and generally regularly arranged, except for an occasional one or two within the circle. These secondary papillæ are numerous (12–19). Isolated hair-like papillæ also occur abundantly in this region. These modified coronate papillæ are large and not very closely placed, so that there are only about 5·5 to the square millimetre. The shape of the posterior hooks, as shown in horizontal sections, is very remarkable. The thick corneous layer is only developed (except where the hook rises above the main papilla) posteriorly to the crescentic papillary upgrowth for the hook (with its concavity directed posteriorly). Posteriorly to the (in section) crescentic upgrowth the epithelial cells become cornified in a thick mass, which anteriorly presents a convexity approximately parallel with the concavity of the crescent. Laterally the thickened corneous mass is continued into two horns which pass anteriorly round the papilla outside the ring of secondary hair-like papillæ. As the section is taken at successively higher levels, these horns are prolonged further and further anteriorly until they seem to meet and enclose the whole papilla. (Thus fig. XXIII. Plate LV. represents a section taken rather low.) The cornified cells of the hooks are remarkably hard, so that the razor cuts them with a very audible sound and with much detriment to its edge; they remain bright yellow after treatment with logwood. A vertical longitudinal section through one of these papillæ is drawn in fig. XXII. Plate LV., and it shows the great size and strength and the curvature of the posterior hook; it also shows the thin anterior corneous layer first appearing where the hook becomes clear of the main papilla. Both these figures alluded to are semi-diagrammatic, and are in some points the probable interpretation of very doubtful appearances due to changes in the tissues. This region is very interesting, for it shows how the slender elements of the coronate papillæ have been modified to perform the tough work of the horny filiform papillæ of higher animals. It is obvious that the strong posterior hooks would first meet any object, and would be obliged to do practically all the work, when the tongue was drawn backwards in licking.

The coronate papillæ above the tip, in front of this peculiar region, are of more regular form; but the posterior secondary papilla (and occasionally one beside it) is more strongly cornified and larger than the others. The cornification also tends to pass anteriorly round the outside of the other secondary papillæ as two horns. In these points there is a transition towards the modified papillæ described above, but the characters increase very suddenly at the limits (posteriorly also) of the peculiar region. The secondary papillæ in the rings are not numerous, 6–8 being common; they are much recurved: the papillæ are small and numerous, *i. e.* about 72 to the square millimetre. There are no isolated hair-like papillæ. The coronate papillæ just in front of the anterior circumvallate papillæ are rather small and closely packed (about 60 to the square millimetre); they are round or oval, and some irregular in shape. A few are remarkably elongated antero-posteriorly (see fig. XXIV. Plate LV., in which the effect may be increased by a slight obliquity of section, but is remarkable anyhow): such elongated papillæ are doubtless formed by longitudinal coalescence, as I have seen traces of a central constriction, and the number of secondary papillæ is about twice the usual number (8–10). There is no special size or cornification in the posterior secondary papillæ. Isolated hair-like papillæ are not present. The upper cells of the papillæ stain deeply, as has been described in *Perameles*; in fact these posterior coronate papillæ are very similar to those of *Perameles*. They are recurved, but less than the anterior papillæ; they are not of the tall slender type like the posterior coronate papillæ of *Belideus*, but are more like the posterior type of *Perameles*, differing from these in the greater symmetry of the ring of secondary papillæ when cut horizontally. The modified papillæ described above are transitional into these by a lessening of the posterior cornified part until it ceases to differ from the rest of the ring.

B. *The Filiform Papillæ* are probably normal in structure, as they are in shape and position.

Thus this tongue comes nearest to *Perameles* in the circumvallate papillæ, but is very peculiar in the coronate papillæ, and primitive in the possession of isolated hair-like papillæ.

General Conclusions.

The above observations may be shortly recapitulated, and the tongues of all the Marsupials yet examined may be classified as follows (the types are printed in italics):—

I. A. *Circumvallate papillæ* approximately identical, bilaterally symmetrical; much protected (the mouth of the involution probably capable of closure), and the pointed apex directed forward (exc.). The taste-bulbs ascend high up the papillary sides in the most typical instances. Posterior angle very obtuse (exc.).

B. *Lateral organ* very primitive, and showing its origin as a row of gland-ducts.

C. *Coronate papillæ* with irregular circles of secondary papillæ (in some places). Intercalated single hair-like papillæ present.

Halmaturus; Macropus; Petrogale; Dasyurus (?).

II. A. *Circumvallate papillæ.*—The two anterior are smaller and of the type described above, although sometimes presenting the characters to a less degree; the posterior larger, and radially symmetrical; the summit is a circular disk which can be seen from the surface; the whole papilla resembles that of the higher mammals (except for the constricted base). Posterior angle acute.

B. *Lateral organ.*—Less primitive; an irregular row of slit-like furrows; gland-ducts distinctly open at the *bottom* of the furrows.

C. *Coronate papillæ* less irregular; no intercalated hair-like papillæ.

Phalangista; *Belideus*; Acrobates.

III. A. *Circumvallate papillæ* approximately identical and of the same type as the posterior papillæ of Division II. Posterior angle varies.

B. *Lateral organ* absent.

C. *Coronate papillæ* very regular; no intercalated hair-like papillæ.

Perameles; Didelphys ? (does not follow C).

It is very interesting (and I venture to think significant) that the structural features which combine together to make one of the above divisions show considerable correlation with one another.

Thus in I., the lateral organ is certainly primitive, the circumvallate papillæ come nearest to those of *Ornithorhynchus*, and the scattered hair-like papillæ perhaps show an approximation to the same animal, in which all the back part of the tongue is thickly covered with papillæ of this description; and so also with divisions II. and III. Even the fact that *Didelphys*, following a different development in another area, should combine some of the characters of two divisions, is exactly what might be expected. The fact that *Didelphys* retains a distinctly marsupial tongue is a proof of the great persistence in this organ of characters which at first sight appear to be transient, and merely related to food and habits.

In a paper on "The Tongue of *Ornithorhynchus*" in the 'Quarterly Journal' for July 1883, I suggested that we found in this animal a structure intermediate between the circumvallate papillæ and the lateral organ. In this I was wrong; it is only related to the former, and the latter develops independently in Marsupials, with the appearance of bulbs in the walls of a row of lateral gland-ducts. But my argument that such a structure might represent an ancestral form of a circumvallate papilla—then based on few data—can now be supported by a long series of intermediate forms.

Looking at this latter question in the light of the observations recorded, the evolution of the circumvallate papillæ and their taste-bulbs is as follows:—Subepithelial tactile end-organs were at first the only means by which food could cause a nervous stimulus. These became more sensitive by the upward growth of the papillary processes (in which they were contained), so that the end-organs were separated from the stimulus by a lessening thickness of epithelium. At the same time sapid substances gained a greater power of penetration by the development of serous glands out of those of the wide-spread mucous type. Probably the gland-ducts surrounded a circular or oval surface in which the end-organs existed. Finally the upgrowth of the end-organ reached a climax in the perforation of the epithelium. At the same time the end-organ must have become gradually modified in a gustatory direction, losing its tactile functions. But at the perforation of the epithelium, the delicate subepithelial end-organ became exposed to the various agencies at work upon the surface of the epithelium. Hence the folding down of the sides of the area, and the opening of ducts into the furrow thus formed, and the protection of nearly all the end-organs (*Ornithorhynchus*, fig. XII. Plate LIV.). In an exposed part of the tongue of the same animal the protective change was carried much further (fig. XIII. Plate LIV.). Then comes a great gap, during which the papillary subepithelial end-organs disappear (due to their delicacy and their need of protection to such an extent as to cause slight usefulness), and new end-organs are developed from the epithelium of the interpapillary processes. These new terminal organs (taste-bulbs) are met with in Marsupials, with distinct indications of their interpapillary origin. Being thus comparatively recent, traces are retained of the old protection necessary for a more delicate end-organ, and hence the series (figs. xiv—xviii. Plate LIV.) in which the most protected forms show *independent evidence* of their primitive condition. With the most perfect protection, there is also the presence of bulbs over the whole of the papillary surface; and as the papilla becomes less protected, the bulbs gradually sink into their normal position of a zone round the papillary base. Even in the highest marsupial papillæ there is some trace of the original protection in the presence of a much constricted base. In some marsupial tongues both conditions coexist, and the less protected, radially symmetrical form is the posterior (*i. e.* the papilla most sheltered by its position, and thus able most quickly to abandon the old excessive protection). It has been much in favour of this theory that I have been able—in more than one part of the subject—to confirm previous suggestions by subsequent work.

As to the primitive triangle of circumvallate papillæ, I have no doubt that we have here the ancestral form of the inverted V arrangement in many higher animals (*e. g.* man). It is possible that, the above being the history of the primitive circumvallate papillæ, in some cases their number may be added to by *direct* development from fungiform papillæ; but this is only a suggestion founded on a superficial examination.

EXPLANATION OF PLATES LIV. & LV.

Fig. i. Natural size. The back part of the tongue of *Halmaturus ualabatus* seen from the right side. The upper surface is seen to be densely papillate, the papillæ being of the coronate type (*i. e.* papillæ surmounted by a circle of fine, hair-like, generally recurved, secondary papillæ, the whole of mechanical function, and as far as is yet known peculiar to and always present in Marsupials; see fig. xxviii, Plate LV.). *f. p.* Fungiform papillæ of the normal structure; few in number and scattered irregularly among the coronate papillæ above the lateral line of junction with the non-papillate surface. *l. f. p.* Lateral filiform papillæ, forming the limits of the papillate surface at the posterior part of the junction with the non-papillate surface. These large and probably tactile papillæ are very constant in this position in the tongues of Marsupials and probably of other Mammalia. The lateral gustatory organ, when present, is to be found (as in this tongue) in the non-papillate surface just below the anterior part of the row of filiform papillæ. *l. g. o.* Lateral gustatory organ, here presenting the appearance of a row of circular elevations with a crater-like depression (generally somewhat elongated) on the summit of each; beneath these elevations is a longer, less regular row of smaller but otherwise apparently similar elevations, *gld. d*; the depressions on the summits of these latter are gland-ducts leading from glands of mucous type. No taste-bulbs are to be found in the walls of the ducts, but they are present in small numbers in those of the larger elevations (*l. g. o.*). But in other respects these last depressions are precisely similar to the former; they lead into glands of serous type, and all their relations are those of gland-ducts (see fig. xxxi. Plate LV.). We therefore have here the simplest form of lateral organ—a row of simple gland-ducts, in the walls of which scattered bulbs are developed. From this type we can pass by gradual stages to the complex lateral organ of Rodents, in which there is but little indication of the true origin, except when looked at in the light derived from the study of such a tongue as that of *Halmaturus*. The arrow (——➤) in all cases points toward that part of the figure which represents the anterior end of the object depicted.

Fig. II. Natural size. The right lateral organ and the adjacent structures of a larger tongue of the same species (*Halmaturus ualabatus*), seen from the side. The references are the same as those of the last figure.

Fig. III. Natural size. The posterior part of the left lateral organ, and the adjacent structures of the tongue of the same species (*Halmaturus ualabatus*), seen from the side. In this specimen two of the smaller elevations (*gld. d.*) are placed higher than the others, and thus come to be situated between the two posterior elevations of the lateral organ. The same references.

Fig. IV. Natural size. One of the three circumvallate papillæ (*c. v. p.*) of the tongue of *Halmaturus ualabatus*, seen from above. The arrangement of these three papillæ is perfectly uniform in Marsupials as far as I have observed; *i. e.* at the angles of an isosceles triangle with the base directed anteriorly. In this species the posterior papilla is situated so far forward that it is placed between the other two, and the three papillæ are very nearly in the same straight line. The reference mark points to the circular funnel-shaped depression leading to the expanded cavity in which the large papilla is situated (see fig. XIV. for vertical section of this structure). The sharp anteriorly directed apex of the papilla is seen in the depression. Coronate papillæ cover the surface round the depression, but they are less marked posteriorly.

Fig. V. Natural size. The tip of the tongue of *Macropus melanops*, seen from beneath. The papillate surface is seen to be continued on to the inferior aspect of the tip, and there ends in an abrupt line against the smooth epithelium. This line of demarcation is parallel with the lateral and anterior contours of the organ. The fungiform papillæ (*f. p.*) are unusually abundant and very variable in size: they are in the usual situation, *i. e.* on the papillate side of the above-mentioned line of demarcation. Their function is probably tactile, and they are scattered among the coronate papillæ. *r.* Ridge in the middle line of the inferior surface of the anterior part of the organ: very constant in Marsupials; it is bordered on each side by a groove (*gr.*). The ridge is usually sharper and the grooves deeper than in this specimen.

Fig. VI. Half natural size. The tongue of *Macropus melanops*, seen from above. *Ep.* Epiglottis. The walls of the cavity have been held open by a needle, shown in the drawing. The reference mark (*c. v. p.*) points to the depression leading into the left anterior circumvallate papilla. The structure is very similar to that of *Halmaturus*. The lateral filiform papillæ (*l. f. p.*) and the lateral organ (*l. g. o.*) occupy very nearly the same position that they have in *Halmaturus*. Only the posterior parts can be seen from this point of view. They are better shown in the next figure. *r′* Median raphe, well marked anteriorly, disappearing posteriorly at about the middle of the length of the organ. Almost the whole of the surface represented is covered with coronate papillæ.

Fig. VII. Natural size. The left lateral organ and adjacent structures of the tongue of *Macropus melanops*, seen from the side. The filiform papillæ have the usual structure and arrangement; anteriorly and superiorly to them the surface is covered with coronate papillæ. The lateral organ (*l. g. o.*) still takes the form of a series of slight elevations with slit-like depressions on their summits. The series forms a very perfect arc, and the regular arrangement (together with the whole structure) shows a decided advance upon the condition of this organ in *Halmaturus*, although a close relation with the latter is obvious. It forms the first transition towards the more complex lateral organ.

Fig. VIII. Natural size. The back part of the tongue of *Phalangista vulpina*, seen from above. The lateral gustatory organ (*l. g. o.*) shows a great advance upon that represented in the last figure. (For other aspects of the lateral organ of *Phalangista* see the next figure and fig. XXXII.

Plate LV.). It now takes the form of a series of slit-like depressions in the smooth epithelium beneath the papillate surface. There are no mound-like elevations, and the whole appearance more resembles that of the well-marked organ of certain higher mammals. Corresponding with this, the sides of the depressions are crowded with closely packed taste-bulbs, and the gland-ducts seem to begin where the taste-bulbs end. Without the knowledge derived from the preceeding species, there would be no suggestion that the gustatory part of the depression is itself a gland-duct (see fig. XXXII. Plate LV.). This well-marked organ is still behind the most complex organ of Rodents in that there is no indication of a lateral area upon which the depressions are arranged, and no elevation of the ridges between the depressions; in fact the attention is merely directed to the slits, while in the more complex organ the ridges also attract notice. Further the slits are less uniform in size and less regular in arrangement than in the well-marked organs of Rodents, &c. The filiform papillæ (*l. f. p.*) have the usual arrangement; many of them have the shape of a triangular flap attached along the base. The circumvallate papillæ (*c. v. p.*) are arranged in the normal manner; the two anterior papillæ are smaller than the posterior and of a different shape (compare figs. XVI. and XX.), the former following the type of *Halmaturus* and *Macropus*, the latter resembling the papillæ of higher mammals. The upper surface of the organ is, as usual, covered with coronate papillæ. This is also true of the other tongues figured (and probably of all Marsupials).

Fig. IX. Natural size. The same tongue (of *Phalangista vulpina*), seen from the right side. The references are the same as those previously used.

Fig. X. Natural size. The tongue of *Belideus breviceps*, seen from above. There is a lateral organ present (hardly visible from above) in the same situation as that of *Phalangista* and of similar structure. The relation of the anterior circumvallate papillæ (*c. v. p.*) to the posterior papilla is also similar to that described in *Phalangista* (compare figs. XV. and XVII.). The anterior contour of the tongue may not be correct. The drawing was made from a spirit specimen in which the tongue was bitten through at the tip, and the anterior narrower part was bent down abruptly. In the figure I have assumed that this was accidental, and this was probably the case.

Fig. XI. Natural size. The tongue of *Didelphys quica* seen from above. The cavity around the epiglottis (*Ep.*) has been widened by separating the walls with a needle (drawn in the figure). The normally arranged circumvallate papillæ (*c. v. p.*) appear to resemble one another, and to follow the higher type. It was impossible to be certain of this, because there had been considerable alteration in the spirit specimen. There appears to be no lateral organ. The transverse ridges in front of the circumvallate papillæ may be accidental. The anterior contour of the tongue may not be quite correct. The coronate papillæ covering a well-marked patch behind the tip (*s. c. p.*) are peculiarly modified, a change being very distinct to the naked eye. The posterior part of the ring of secondary papillæ is occupied by a single, very strong, cornified, recurved hook (see fig. XXII. Plate LV.).

The seven succeeding figures (XII. to XVIII.) illustrate a gradual transition from the circumvallate papillæ of *Ornithorhynchus* to those met with in the higher mammals. This transition is from a bilaterally symmetrical structure, with taste-bulbs developed over its entire surface, to a radially symmetrical structure with the taste-bulbs confined to a belt round the base of the papilla. At first the papilla is but slightly withdrawn from the surface (fig. XII.); then it is deeply placed at the bottom of a narrow cleft (fig. XIII.); it then gradually emerges through a long series into the usual type of higher mammals (figs. XIV. to XVIII.).

Fig. XII. × 14·5. Transverse section of the posterior bulb-bearing ridge of *Ornithorhynchus*. It is probable that taste-bulbs were first developed upon an oval area surrounded by gland-ducts. Owing to the delicacy of these terminal organs the area became protected by a fold round its circumference in which all the bulbs except those of the central line were sheltered. This is the stage represented in the figure, and has not proceeded further because the whole structure is additionally protected by its position in the tongue. *t. b.* taste-bulbs. *f. h. p.* Fine hair-like papillæ covering the posterior part of the organ. *f'. h'. p'.* Fine hair-like papillæ posterior to the bulb-bearing organ and of different form from the others. *gld. d.* Gland-duct of serous gland.

Fig. xiii. × 14·5. Transverse section of the obliquely directed anterior bulb-bearing ridge of *Ornithorhynchus*. *gld. d.* Duct of serous gland opening into the narrow space between the ridge and the cavity in which it is placed. The ridge is placed upon a very exposed part of the tongue, and is therefore most exceptionally protected, being only reached from the surface through a narrow chink (probably closed by a sphincter muscle). The necessity for this extreme protection is probably to be found in the structure of the bulbs, which is very different from that of higher mammals.

Fig. xiv. × 14·5. Vertical longitudinal section through the left anterior circumvallate papilla of *Halmaturus ualabatus*. *c. p.* Coronate papilla. The taste-bulbs (*t. b.*) are now of the normal marsupial type (leading up to those of the higher mammals, but showing traces of development from the cells of an interpapillary process), and are probably less sensitive than those of *Ornithorhynchus*, which are essentially subepithelial. The apex of the papilla emerges from the cavity in which most of it is placed, but the part thus exposed is not covered by taste-bulbs, which are present over all the protected part (nearly the whole). The apex is directed forwards and the symmetry is bilateral. It is very likely that the mouth of the depression can be closed.

Fig. xv. × 14·5. Vertical section through one of the anterior circumvallate papillæ of *Belideus breviceps*. The apex is directed inwards rather than forwards, but the two papillæ are bilaterally symmetrical together, if not so individually.

Fig. xvi. × 14·5. Vertical longitudinal section through one of the anterior circumvallate papillæ of *Phalangista vulpina*. The apex is directed forwards. *gld.* Gland of which the ducts (*gld. d.*) are seen opening into the space between the papilla and its cavity.

Fig. xvii. × 14·5. Vertical section through the posterior circumvallate papilla of *Belideus breviceps*. It is likely that this papilla is radially symmetrical, for the difference between the two sides is probably accidental. The overhanging surface which bears the bulbs is a trace of the structure shown in the preceding figures. Otherwise the shape resembles that of the higher mammals. It is very interesting that the anterior and posterior papillæ of the same tongue should belong to such different types (figs. xv. & xvii.).

Fig. xviii. × 14·5. Vertical section through a circumvallate papilla of *Perameles nasuta*. Very similar to the last, but symmetry decidedly radial. All the three papillæ in this species are of the same type.

Fig. xix. × 40. Horizontal section through the depression (*c. v. p. o.*) leading into the cavity containing the posterior circumvallate papilla of *Halmaturus ualabatus*. The opening is surrounded by an irregular ring of fine papillæ (*r. f. p.*) (not aggregated into coronate papillæ). This section indicates the extreme narrowness of the opening into the cavity. It is very probable that the mouth can be closed by a sphincter, and that it is contracted in this instance.

Fig. xx. × 40. Vertical section through the posterior circumvallate papilla of *Phalangista vulpina*. This papilla also belongs to the higher type, while the anterior papilla of the same tongue is shown in fig. xvi. Most of the references have been previously explained. *gn. c.* Ganglion-cells arranged in groups at the lower part of a mass of nervous tissue prolonged downwards from that in the axis of the papilla. A few cells are also present in the upper part of the same mass. *n.* Nerve leaving the mass in the axis of the papilla. *t. m.* Dense mucosa prolonged into the papilla, where it becomes unravelled and supports the nervous structures. *st. m.* Striated muscle-fibres terminating in the dense mucosa at the point where the latter is bending upwards to enter the papilla. It would seem that contraction of these fibres must retract the papilla, and may protect it by causing the mouth of the cavity to close tightly round its upper part; but another and opposite interpretation is possible.

Fig. XXI. × 71·5. Section transverse to the long axis of a circumvallate papilla of *Halmaturus ualabatus* at about the thickest part (see fig. XIV. Plate LIV.). *s. l.* Superficial lamina of cornified epithelium, through which the short gustatory pores pass vertically. *s. ep.* Stratified epithelium between the outer parts of the bulbs (the remains of that from which the bulbs were developed). *t. b.* Taste-bulbs. *s. e. l.* Subepithelial layer, probably consisting of elements of the nervous and fibrous tissues (of the next layer), arranged in extremely fine interpenetrating networks. In addition to this arrangement straight radial fibrils are seen passing from the next layer towards the bulbs. It is evident that the nerve-fibres are reduced to their ultimate structural elements in this layer before ending in the cells of the bulbs. *f. l.* Fibrous layer supporting the nervous tissues and the whole papilla, continued into the papilla from the dense mucosa round it (see fig. XX. Plate LIV.). Nerves are seen passing through this layer to that last described (*s.e.l.*). *c. n.* The nerves in the axis of the papilla, gradually passing outwards through the last layer (*f. l.*).

Fig. XXII. × 40. Vertical longitudinal section through one of the strongly developed and modified coronate papillæ from the patch behind the tip of the tongue of *Didelphys quica* (see fig. XI. *s.c.p.*, Plate LIV.). *s. e.* Superficial epithelium. *p. h. p.* Strongly cornified (*c. e.*) recurved hook taking the place of the normal posterior hair-like papillæ. *p. p. p.* Posterior papillary process entering the base of the latter. In this section a line of cells continued from the apex of the papillary upgrowth can be distinguished from the cornified cells of this hook-like structure. *a. h. p.* Anterior hair-like papilla of normal structure. *a. p. p.* Its papillary process. This section is taken along the line A–B of the next figure.

Fig. XXIII. × 50. Horizontal section through a similar papilla (of *Didelphys quica*), taken along the line A–B of the preceding figure. *p. h. p.* The posterior cornified hook is seen to possess a very singular outline. The two arms of the crescent arise outside the normal secondary papillæ, indicating that the structure does not entirely correspond to the latter, but probably belongs in great part to the sides of the primary papilla. *p. p. p.* The crescentic papillary upgrowth for the hook, of very remarkable outline and relation to the papillary processes of the normal secondary papillæ. *a. h. p.* Anterior hair-like secondary papilla (normal). *s. h. p.* Single hair-like papillæ scattered between the coronate papillæ as in some other Marsupials, and similar to the normal secondary papillæ of the coronate structures.

Fig. XXIV. × 50. Horizontal section through a coronate papilla just in front of the anterior circumvallate papillæ of *Didelphys quica*. *h. p.* Hair-like secondary papilla, of which there is a very unusual number. The shape of the coronate papilla is very remarkable, and probably arises from longitudinal coalescence.

Fig. XXV. × 14·5. Horizontal section through the coronate papillæ (*c. p.*) of the region halfway between the tip and the anterior circumvallate papillæ of *Macropus melanops*. Posteriorly the section is deepest, and shows the single main papillary upgrowth for the whole coronate papilla (*c. p. p.*). A little higher the secondary papillary processes for the anterior hair-like papillæ are distinct (*a. p. p.*), while the posterior processes are still fused into a single upgrowth, crescentic in section (*p. p. p.*). At a higher level than is shown in this section the complete ring of secondary processes would be distinct. Hence the posterior papillary processes are given off at a higher level (compare fig. xxvi.). *s. h. p.* Single hair-like papillæ, as in fig. xxviii. This section shows that the upgrowths for the isolated hair-like papillæ are very distinct from those of the coronate papillæ even at the lowest levels.

Fig xxvi. × 14·5. A single coronate papilla from the region between the two anterior circumvallate papillæ of *Macropus melanops*, shown in perspective from the left side. The secondary papillæ are probably finer than in reality.

Fig. xxvii. × 10. Vertical longitudinal section along the middle line of the papillate surface in front of the anterior circumvallate papillæ of *Halmaturus ualabatus*. The section shows the relation of the isolated fine papillæ (*s. h. p.*) to the coronate papillæ (*c. p.*).

Fig. xxviii. × 40. Horizontal section through the coronate papillæ of *Halmaturus ualabatus*, taken in the middle line just anterior to the posterior circumvallate papilla. This also shows the relation of the isolated (*s. h. p.*) to the coronate papillæ (*c. p.*), and also indicates that the secondary papillæ on the latter are not always regularly arranged in the ring. The posterior side of a coronate papilla can sometimes be detected by the fact that some of the posterior secondary processes remain still coalesced, although they are distinct at other points of the circumference. *i. h. p.* Single hair-like papillæ within the ring of some of the coronate papillæ.

Fig. xxix. × 40. Vertical longitudinal section through a coronate papilla (vertical transverse through the organ), just above the lateral organ of *Halmaturus ualabatus*. The figure shows the relations of the four layers of a complex epithelium to the papillary structure. The layers are:—1, staining moderately, the cells fusiform and nucleated; 2, a thin layer, behaving with reagents as if the cells were cornified; 3, deeply staining, elongated cells with long thin nuclei; 4, a layer presenting all the characters of normal *rete Malpighii*. The distribution of layer (2) in the secondary papillæ (*p. h. p.* and *a. h. p.*) also indicates that it is cornified. The same layers are met with in the smooth epithelium beneath the papillate surface (see fig. xxxi.). The shading is diagrammatic. In other parts of the organ, the distribution of layer (2) is more symmetrical in the secondary papillæ.

Fig. xxx. × 50. Vertical longitudinal section through a coronate papilla from the surface above the tip of the tongue of *Phalangista vulpina*. The figure shows the arrangement of the cells much resembling that described in *Perameles*, but more complex. The normal lower layer (*n. l.*) graduates into attenuated granular cells (*a. c.*), passing through a mass of similar cells of which the nuclei stain deeply (*n. c.*), into the very attenuated cells of the posterior process (*p. c.*), in which hardly any nucleus can be detected. Above, in the centre of the main papilla, the cells are still granular, but swollen and non-staining (*s. c.*), while remnants of the nucleus can be often detected. Higher still, and towards the posterior secondary papilla, the cells again become attenuated, rarely nucleated, and deeply staining (*a′. c′.*), and they are continued on to the posterior papillæ. The swollen cells pass directly into the attenuated cells of the anterior papilla without forming a layer in the main coronate papilla. All the secondary papillæ also derive cells from their own papillary upgrowths, and also from the superficial epithelium surrounding them. The latter is simple and of the usual structure.

Fig. xxxi. × 14·5. Vertical transverse section through one of the elongated depressions of the lateral organ of *Halmaturus ualabatus*. The depression (*g. d.*) is seen to present all the characters of a gland-duct, and a secondary duct opens into it above the region of the taste-bulbs (*t. b.*). In the epithelium the four layers described in fig. xxix. are shown.

The layers are thicker on the left because that side leads towards the thicker epithelium of the papillate surface.

Fig. xxxii. × 14·5. Transverse vertical section through four of the furrows of the lateral organ of *Phalangista vulpina*. The drawing is in outline only, and the bulbs are not indicated. The irregular direction of the trenches makes it impossible to obtain a true transverse section of them all, and therefore the epithelium in places appears thicker than it really is (being cut obliquely). Owing to the same cause two or three rows of bulbs are sometimes seen in one thickness of epithelium. *s. e.* Superficial epithelium with papillary processes below. *g. d.* Gustatory depressions with smooth epithelium. *gld.* Serous glands with their ducts (*gld. d.*) opening into the bottom of the furrows.

2. A Contribution to our Knowledge of the *Embiidæ*, a Family of Orthopterous Insects. By J. Wood-Mason, Deputy Superintendent, Indian Museum, Calcutta.

[Received November 28, 1883.]

(Plate LVI.)

1. Introduction, p. 628.
2. Discovery of Larvæ apparently living in Society, p. 629.
3. Discovery of the Wingless Female, p. 630.
4. Description of the Female Characters, p. 630.
5. Capture of Winged Males, p. 631.
6. Description of the Male Characters, p. 631.
7. On the Wings of *Embia* (*Oligotoma*) *saundersii*, p. 632.
8. Affinities of the Group, p. 634.

Introduction.—While I was at home on furlough in 1877–79, Mr. R. M'Lachlan, F.R.S., drew my attention to this imperfectly known little group of insects, and begged me to attempt, on my return to India, to supply some of the deficiencies in our knowledge regarding it. I promised to do what I could in the matter; and, before leaving England, prepared myself for my task by examining the different collections of dried specimens and by reading up the literature of the subject; in particular Mr. M'Lachlan's[1] then recently published paper, containing (1) a *résumé* of the few and scattered items of additional information that had been placed on record by various naturalists during the forty years that had elapsed since the appearance of Westwood's[2] memoir in the year 1837; (2) descriptions of four new species; and (3) the record of the discovery, in an orchid-house near London, of the so-called nymph-stage of a species imported into England with plants from India—a valuable observation, which proves that in the Embiidæ we have to do with a group of insects whose members, like the true Orthoptera, the Earwigs, and the White-Ants, and like the Psocidæ, the Physopoda, and the Rhynchota, attain to the adult condition without undergoing any metamorphosis in the entomological sense of the term.

From the examination of specimens and the perusal of the literature I arrived at the conclusion that all the specimens of all the species

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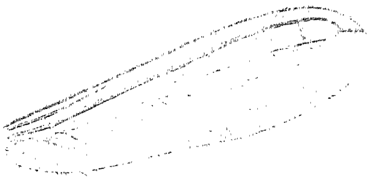
[1] Journal Linn. Soc. Lond., Zoology, vol. xiii. pp. 373–384, pl. xxi.

[2] Trans. Linn. Soc. Lond. vol. xxii. pp. 369–375, pl. xi.



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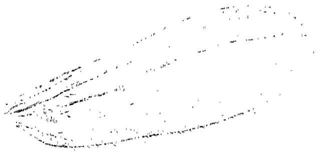

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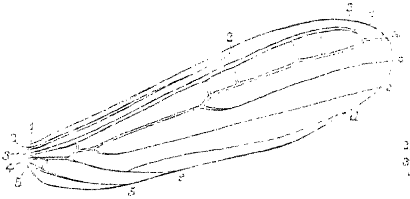

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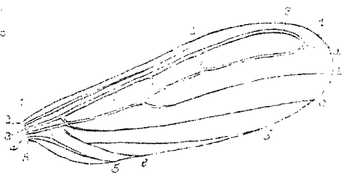

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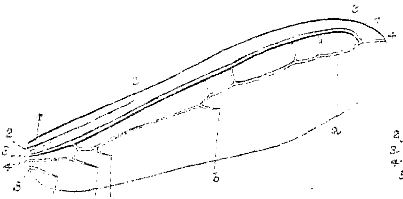

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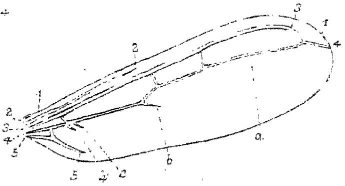

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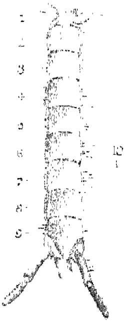

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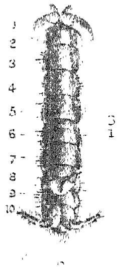

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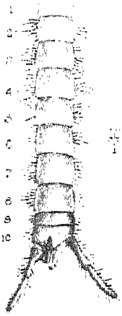

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B.L.D. et J.W.M. del.　　Hanhart imp.　　J Smit lith.

MORPHOLOGY OF EMBIIDÆ.

that had up to that time fallen into the hands of entomologists were of the male sex, and that the females were consequently unknown; for in all the specimens examined by me the abdomen invariably presented a mesially imperforate series of nine sterna, the ninth and terminal of which was produced nearly to the extremity of the body so as to cover the tenth sternum and its contained genital aperture, just as in male Cockroaches, Earwigs, &c.; it exhibited a greater or less degree of asymmetry of its terminal somites or of their appendages or of both, as in many male Cockroaches, Phasmatidæ, Lepidoptera, Trichoptera[1], &c.; and, moreover, an asymmetrical system of highly indurated spines and hooks springing asymmetrically from its podical plates, and analogous to the similar, but usually more complicated, apparatus developed around the genital aperture in male Cockroaches and Mantodea, could generally be made out.

I also formed the opinion that the females when discovered would prove to be wingless, and probably larger in size.

Both conclusion and opinion have since been fully verified by the careful examination of living and spirit-specimens of indubitable males, and by the discovery of the larger and wingless female of one species; from which latter fact I have no hesitation in inferring greater size and winglessness in the females of all the species of the group.

Discovery of Larvæ of a Species apparently living in Society.—My first acquaintance with a living species of Embiidæ was made a few hours after landing in India, on the journey by rail from Bombay to Calcutta, in the end of July 1879, at Jubbulpore, where I was obliged to stay a night in order to break the journey. While strolling about in front of the hotel about noon on the following day I came upon a bare and sandy spot, over which larvæ of a species of Embiidæ were actively running by dozens; and I succeeded in capturing a number of specimens, both in the open and beneath the old bricks that lay scattered about and had evidently been used in the construction of rude fire-places for cooking their food by a party of coolies by whom the spot had a short time before been occupied as a camping-ground. A violent thunder-storm which suddenly came on while I was searching for the nest or tunnels inhabited by the insects drove me indoors ; and, having to resume my journey shortly afterwards, I had much against my will to forego an opportunity of ascertaining the habits of the Embiidæ that may not soon recur. Not expecting to meet with *Embiæ* in such a place, I should have passed them over without notice had it not been for their marked Thysanurous gait and shape ; and I was much disappointed at finding, as I soon did, that instead of a new Thysanuran with two-jointed cerci and a living representative of the ancestors of the Staphylinidæ, I had got hold of an *Embia*.

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[1] I am indebted to Mr. M'Lachlan for the following information concerning the asymmetry of the male anal appendages in this order of insects. Inequality is not confined to any special portion or set of appendages, and occurs in all the four or five species of the genus *Glossosoma*, and is generic, affecting the ventral portion of the anal apparatus; in an undescribed species of *Leptocerus*, from Portugal, in a pair of inner processes, which in other most closely allied species are equal (a long series of specimens examined); in *Setodes interrupta*, in which one pair of appendages extends far beyond the extremity of the body, and is, as I can testify from having inspected Mr. M'Lachlan's drawings, tremendously unequal; and probably in other species. The last case is, as Mr. M'Lachlan writes, especially "remarkable, because there is another species (*S. similis*, M'L., represented by many individuals) from Turkestán so similar in all other respects that it did not occur to me [him] at first to consider it distinct; but I [he] thought I [he] might as well see if locality had caused any modification, and to my [his] astonishment found a purely symmetrical and utterly different (specific) condition (correlated with a very slight and unimportant difference in wing-markings)."

Some of the specimens obtained on this occasion were forwarded to Mr. M'Lachlan[1], who has expressed the opinion that they probably belong to *Oligotoma saundersii* of Westwood, a species originally described from Calcutta specimens. In none of those which were retained by me for my own use are the slightest traces of wings to be detected, although the asymmetry of the caudal appendages, which I consider to be characteristic of and exclusively confined to the male sex, is already quite apparent. The asymmetry of the tergum of the terminal abdominal somite and of the cerci in the males of *Necrosia maculicollis*, one of the Phasmatidæ, appears at the corresponding early stage, and in nymphs is quite as strongly marked as in perfect insects.

Discovery of a Female.—In the following October, on the first zoological excursion I made after my return to Calcutta, I met with an insect possessing all the characters, including the peculiarly fashioned fore legs of the Embiidæ, but devoid of all traces of wings and abdominal asymmetry. I found it in the large plant-house in the Botanic Gardens, crawling over the leaves of a plant of the habit of *Fittonia*. It is a shining black insect with pale-tipped antennæ, and as it lay upon the leaves it bore a striking resemblance to a larva of some brachelytrous beetle or to an Earwig with a short forceps. It measured no less than three quarters of an inch in length from the front of the head to the end of the abdomen, and is consequently about thrice as large as the smallest, and twice as large as the largest, of the previously described specimens, compared with which it is further remarkable for its thick and firmly chitinized integument. It, in fact, answers exactly to the idea I had formed of what the female would be like, and it is, as I shall show, a female.

Description of the Female.—In its abdomen, counting the so-called "*segment médiaire*" as the first somite, as it unquestionably is, though here, as is often the case in other groups of insects, its tergum is firmly ankylosed to the metathorax in adults and its sternum appears to be undeveloped, ten terga, the full number of the typical insectean abdomen, are externally visible, the two penultimate ones (which in the Cockroach and in the Earwig are shortened and squeezed up out of sight between the last or tenth and the seventh) being equally well developed with the rest ; the last or tenth tergum is entire, rounded, obtuse, and deflexed at the end, and, with the two-jointed cerci attached to its huge and firmly chitinized podical plates, perfect in its symmetry.

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[1] Proc. Ent. Soc. 1879, p. xliii.

Turning to the lower or ventral surface of the animal, and counting as before the "*segment médiaire*" as the first abdominal somite, we find a series of nine sterna, corresponding to the nine basal terga, all likewise visible without dissection, the eighth and ninth not being shortened any more than are their terga, nor concealed from view by any enlargement and production of the seventh, as they are in the Cockroach and in the Earwig, and the tenth alone being hidden by the overlapping posterior margin of the ninth. The abdomen, in fact, in this insect is, so far as its eighth and ninth somites are concerned, less modified than in either of these two forms, thus resembling that of *Campodea*. Between no two of the eight basal of these sterna is any aperture to be detected in the middle line, nor is there any between the ninth and tenth, the former of which is identical in shape and texture with the seven basal ones; but the eighth is shorter and differently shaped from those which precede it, its hinder angles being produced and rounded so as to form in its hinder border an emargination, to the bottom of which is movably articulated by its base a triangular plate, whose basal angles are divided off from it by sutural lines; between the eighth sternum with its triangular plate and the ninth lies a wide and membranous space conspicuous by its white colour, and in it an aperture, which is ordinarily concealed by the triangular plate. As no other median aperture save the anus exists, this must be a genital aperture, and since it is placed, as in the females of the Cockroach and the Earwig, between the eighth and ninth sterna, and since moreover the genital aperture of winged specimens is situated, as in the males of the same two insects, one somite further behind, it must be the female genital aperture, and the insect a female.

Capture of Males.—Several winged specimens were captured during 1880 in my dining-room, whither they had been attracted by the lights. After flying for a while round and round the lamp in the centre of the table, they settled and walked about the cloth with a most peculiar gait, by which they were always readily recognizable, and which appeared to be due to locomotion on all sixes over such a surface being rendered impossible or awkward for them by the peculiar structure of their fore legs.

These insects, which undoubtedly belong to *O. saundersii*, are all of the same uniform brown colour.

Later, a winged specimen of another species was brought to me by one of the Museum assistants, who had found it clinging to the mosquito-curtains of his bed, a position in which insects that have been attracted by the lights of the house over night are not unfrequently to be found in the morning. This specimen is black.

Description of the Male Sexual Characters.—All the winged specimens examined by me agree with the above described female insect in the number of their externally visible terga, differing from it in having an unbroken and mesially imperforate series of nine, instead of eight, sterna; their genital orifice must consequently lie behind the ninth or last of these sterna, in the same somite, that is to say, as that of the male Cockroach, and one somite further back than in the female, in which, as we have seen, it is placed between the eighth and ninth sterna just as in female Cockroaches. All present a more or less marked asymmetry of the caudal appendages; and in some there project between these appendages the tips of one or more "slender spiniform processes," which Mr. M'Lachlan suggests may be an intromittent organ, but I consider to belong rather to a genital armature analogous to that of the common Cockroach.

In *Oligotoma saundersii*, the only species of which I have as yet examined spirit-specimens, the abdominal asymmetry is carried to an extreme, and the genital armature is well developed and readily seen. In this species not only are the caudal appendages unequal on the two sides, but the tenth tergum and the ninth sternum also depart widely from symmetry, especially the former, which, as will be seen from the accompanying figures, is incompletely divided by a deep angular notch into two unequal and greatly dissimilar parts; and each podical plate bears one or more processes forming an asymmetrical apparatus of spines and hooks, which are analogous to the incomparably more complex genital armature of most male Cockroaches, and doubtless serve, in the absence of an intromittent organ, to keep the aperture of the vas deferens closely applied to that of the oviduct during copulation.

On the Wings.—No one can look upon an Embia without being struck by the wide difference between it and such an insect as a fully winged Cockroach in the mode and place of attachment of the wings and in the condition of the wing-bearing somites. In the larvæ of all ametabolous insects the thoracic somites differ from those which follow only in their greater size, and their terga are distinct from, and overlap, each other just in the same manner as do those of the abdomen; they are, in fact, temporarily in the same condition they permanently have in the Thysanura, which never possess wings—young *Blatta* and young Earwigs resembling adult *Campodea* and adult *Machilis*. The wings appear as expansions of the sides and hinder angles of the two posterior of these somites, the terga of which are in the perfect insect no longer freely movable upon one another, but on the contrary are firmly knit together and soft, and have the fully evolved wings attached to them along the whole length of their sides. But species which have lost their organs of flight retain the primitive characters of their wing-bearing somites throughout life.

We thus see that concentration of the two alary somites accompanied by flexibility of their terga is correlated with the fully-winged condition, and, conversely, that the absence of such concentration and flexibility, that is to say, the retention of the primitive characters of the thorax, is correlated with the wingless condition.

In winged Embiidæ, and especially in *Oligotoma michaeli*, the thorax retains much of the primitive (larval) character of its two posterior somites, and the wings, instead of articulating with the whole length, are attached along only very short portions, and those at the extreme anterior ends, of the sides of their elongated somites.

This remarkable position of the wings seems to be explained by their having been gradually reduced till they became so small as no longer to need a concentrated thorax such as is to be seen in fully winged insects, and by the thorax having as gradually reverted to its primitive condition in the larvæ, and come to retain it permanently. In fact, as little by little the wings decreased in breadth, and consequently in the breadth of their attachments, their two somites appear to have increased in length behind them. Of their having been reduced, and of their being probably in process of still further reduction, the wings of two of the species bear the evidence on the face of them in the shape of one or more rudimentary veinlets; and one of the species, namely *O. michaeli*, has, according to Mr. M'Lachlan's figure of it, narrower and more pedunculated wings, and a more primitive thorax than the other, namely *O. saundersii*, the wings of which are fully described and figured below.

The species of the subgenus *Embia* would also seem to differ amongst themselves in the breadth of the wings, some having been described as having these organs broad, others as having them narrow.

The coloration of the wings is also remarkable. It is usually described by systematists as "fuscous black" or "fuliginous," "with four" or "five whitish streaks," as the case may be; but for my purpose it will be better to describe it as hyaline with the [black or] brown veins all so broadly bordered on both sides with pale [black- or] brown-smoky as to leave only narrow streaks of the ground-colour visible. In addition to the microscopically minute setæ with which the whole wing-membrane is thickly and regularly studded, other and much longer setæ are present, having a definite arrangement along the edges and in rows on the disk of the wings, namely, one row on each vein, and one row on each side of each vein along the margins of the brown bands, or three rows to each vein. The advantage of describing the colour and clothing of the wings in the way I have done will at once become evident when I add that the brown bands with their triple lines of setæ remain to mark the original courses of veins which have long since disappeared, and are now only represented by minute tapering processes jutting out from existing veins a short distance into the wing-membrane.

There is yet another point of interest about the wings. Professor Westwood describes and figures the second or subcostal vein of both pairs of wings as long and as anastomosing with the third or radial vein near the extremity of the wing; and Mr. M'Lachlan speaks of the coalescent subcosta and radius; and both in dried and alcoholic specimens these veins under an ordinary lens really appear to have this arrangement and development; but when the wings are mounted in spirit and viewed under the microscope, it is readily seen that the subcosta is quite short, and that its inclination to the anterior margin is such that it would, if produced far enough, run into the costal vein at a point situated a little beyond the middle of the wing. The illusive appearance of the presence of two concomitantly and commensurately developed veins in the anterior part of each wing is apparently due to a shadow of the radius being cast upon the margin of the brown border of the costa, so as to coincide with the remains of the subcosta; and Professor Westwood has been the victim of an optical illusion.

Affinities.—In anticipation of the full and detailed account of the numerous and important differences between them and the *Perlidæ* which is in preparation, and will be published as soon as the drawings needed to render my descriptions intelligible are ready, I may say that the *Embiidæ* undoubtedly belong to the true Orthoptera, that they are in my opinion in some respects the lowest term, and in others the lowest term but one, of a series formed by the families *Acridioidea*, *Locustidæ*, *Gryllidæ*, and *Phasmatidæ*, and that their resemblances to the much lower *Perlidæ*, which may well be direct descendants of a form closely related to *Campodea*, are due to their low position in the division of Orthopterous insects to which they belong, and do not imply any such close genetic relationship to them as has been suggested.

EXPLANATION OF PLATE LVI.

Fig. 1. The right anterior wing of a male of *Embia* (*Oligotoma*) *saundersii*, Westwood, × 10.

Fig. 1 *a*. The right posterior wing of the same, × 10.

Figs. 2, 2 *a*. The same wings with all the details omitted in order that the venation may be seen more distinctly:—1, 1, the first or costal vein; 2, 2, the second or subcostal vein; 3, 3, the third or radial vein; 4, 4', 4, the forked fourth or discoidal vein, 4' its rudimentary posterior prong; *c*, the rudimentary first branch; *b*, the rudimentary second branch; and *a*, the termination of its anterior prong (4, 4), which is apically anastomosed to the radius, and connected with it by five transverse veinlets in the anterior wings and by three in the posterior; and 5, 5, the rudimentary fifth or anal vein, which is simple and unbranched and connected with the root of the fourth by a transverse veinlet in both the nearly homonomous wings of this insect.

(N.B. All the lines in these figures represent veins, with the exception of that commencing at a point situated a short distance behind the apex of the anastomosed radial and discoidal veins, ending near the origin of the fifth vein, and representing the posterior margin, in which there is no vein.)

Figs. 3, 3 *a*. The same wings with the venation restored by the aid of the brown bands and triple lines of setæ: *e*, the lost posterior, and *d*, the lost anterior fork of the rudimentary posterior prong of the discoidal vein.

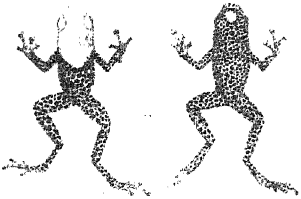
(N.B. All the lines in these figures represent veins.)

Fig. 4. The abdomen of *Embia* (*O.*) *saundersii* ♂, from above, × 10.

Fig. 5. The same from below, × 10.

Fig. 6. Abdomen of *Embia* (*O.*) *michaeli*, M'L., ♀, from below, × 3.

(N.B. The arabic numerals in the three preceding figures refer to the somites of the abdomen.)



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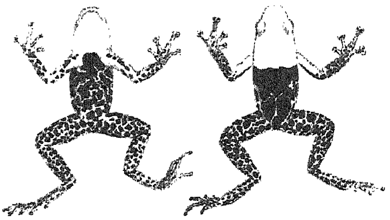

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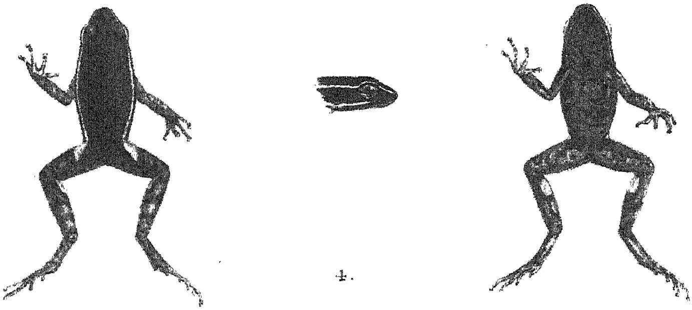

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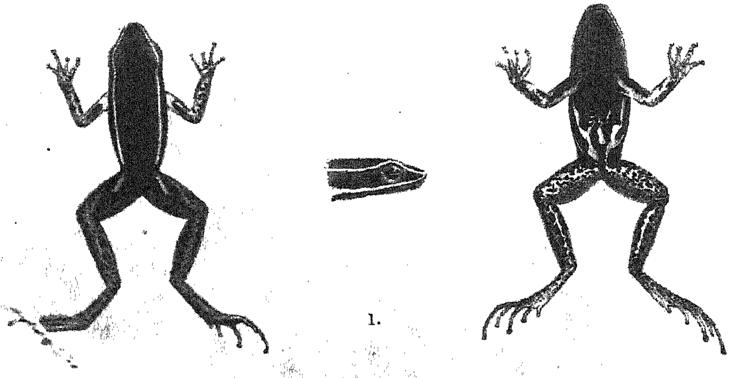
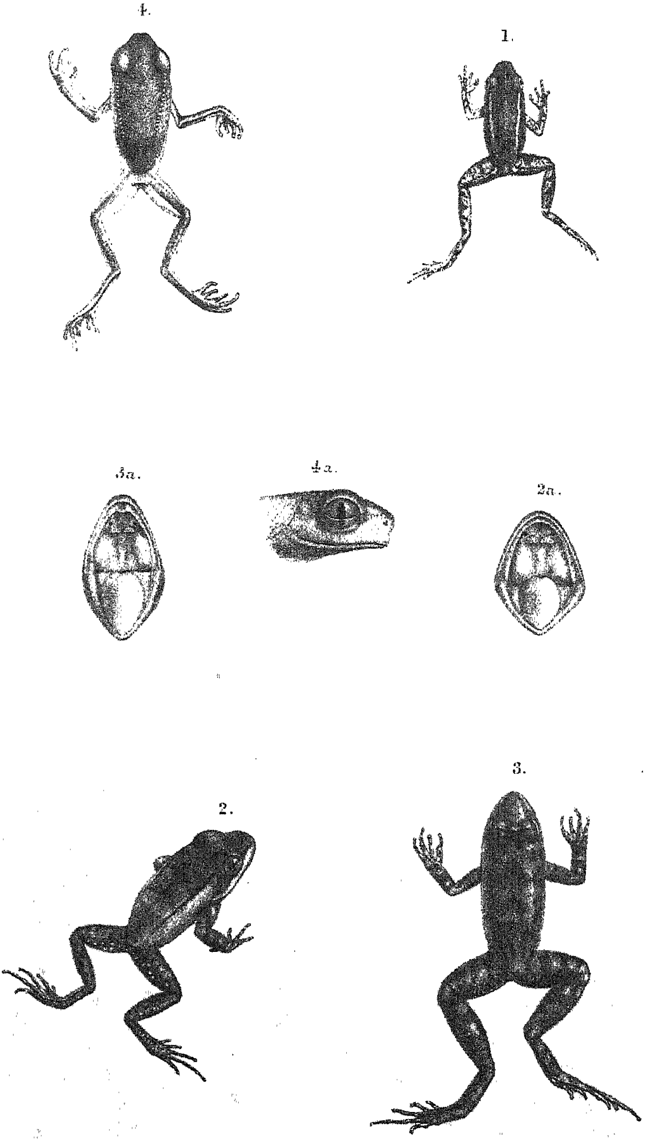


1.

R. Mintern del. et lith.

Mintern Bros. Chromo imp.

1. PROSTHERAPIS FEMORALIS.
2. DENDROBATES RETICULATUS.
3. DENDROBATES FANTASTICUS.
4. DENDROBATES HAHNELI.



R. Mintern del. et lith.

Mintern Bro's. imp.

1. PHYLLOBATES TRILINEATUS.
2. LEPTODACTYLUS RHODOMYSTAX.
3. LEPTODACTYLUS DISCODACTYLUS.
4. PHYLLOMEDUSA PERLATA.

3. On a Collection of Frogs from Yurimaguas, Huallaga River, Northern Peru. By G. A. Boulenger, F.Z.S.

[Received December 6, 1883.]

(Plates LVII., LVIII.)

An interesting collection of Frogs, made at the above locality by Dr. Hahnel, adds considerably to our fragmentary knowledge of the Batrachian fauna of North-eastern Peru. It contains examples of 18 species, 8 of which are new. Examples of the new and of some of the rarer known forms have been secured for the British Museum. The specimens having been deposited in very weak spirit and protected from the light, the coloration is wonderfully well preserved.

1. Prostherapis femoralis, sp. n. (Plate LVII. fig. 1.)

Snout depressed, projecting, truncate, with angular canthus rostralis and vertical loreal region; nostril nearer the tip of the snout than the eye; interorbital space broader than the upper eyelid; tympanum perfectly distinct, half the diameter of the eye. First finger longer than second; toes with a slight rudiment of web; disks of fingers and toes small; subarticular tubercles small; two very small metatarsal tubercles. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the posterior border of the eye. Skin tubercular above. Blackish brown above, limbs lighter and marbled with darker; a narrow white line on each side of the body, extending on the outer border of the upper eyelid and the canthus rostralis to the end of the snout, where it is continuous with its fellow; a second parallel white line on the flanks; a third on the upper lip, from below the nostril, extending to the arm; lower surface of arm and base of same, and an oblique band on inner half of upper surface of femur, bright yellow; throat and breast blackish brown; abdomen and lower surface of hind limbs brown- and white-marbled. From snout to vent 27 millim.

Two specimens, ♂ ♀.

Closely allied to *P. inguinalis*, Cope; distinguished by the distinct tympanum and the coloration.

2. Phyllodromus pulchellus, Espada.

3. Dendrobates reticulatus, sp. n. (Plate LVII. fig. 2.)

Snout truncate, longer than the diameter of the eye; loreal region vertical; interorbital space broader than the upper eyelid; tympanum scarcely distinct, half the diameter of the eye. First finger not extending so far as second; disks of fingers large, truncate, of toes smaller; subarticular tubercles feebly developed; two scarcely distinct metatarsal tubercles. The hind limb being carried forward along the body, the tarso-metatarsal articulation reaches a little beyond the tip of the snout. Skin smooth. Upper surface of head, back to sacrum, and a spot on the chin, pink; the rest of the animal black, elegantly reticulated with grey. From snout to vent 17 millim.

Closely allied to *D. tinctorius.*

Several specimens, probably young.

4. DENDROBATES FANTASTICUS, sp. n. (Plate LVII. fig. 3.)

Closely allied to *D. tinctorius* and *reticulatus*, but differing from the former by the longer limbs, the tarso-metatarsal articulation reaching beyond the tip of the snout, and from both by the belly being granulate. Head to fore limbs above and below yellow; humerus above, and the borders of the yellow colour white; the rest of the body and limbs black, with wide-meshed grey reticulation. Male with a subgular vocal sac. From snout to vent 20 millim.

Four specimens, ♂ ♀.

5. DENDROBATES TRIVITTATUS, Spix.

The lines and other markings on the upper surfaces bright yellow.

6. DENDROBATES HAHNELI, sp. n. (Plate LVII. fig. 4.)

Snout truncate, as long as the diameter of the eye; loreal region vertical; interorbital space broader than the upper eyelid; tympanum indistinct. Fingers and toes slender, the tips dilated into small disks; first and second fingers equal in length; subarticular tubercles feebly developed; two scarcely prominent metatarsal tubercles. The hind limb being carried forward along the body, the tarso-metatarsal articulation reaches beyond the tip of the snout. Back slightly tubercular. Black; limbs above blackish grey, black-barred; a narrow white line, turning to bright yellow near the loins, on each side of the body, extending on the outer border of the upper eyelid and the canthus rostralis to the end of the snout, where it unites with its fellow; a white line on the upper lip, from the vertical of the anterior border of the eye to the arm; a bright orange-yellow spot at axilla, another on upper surface of femur near the loin, and a third on inner surface of tibia near the femur; belly and lower surface of limbs marbled with grey. Male with a subgular vocal sac. From snout to vent 23 millim.

Allied to *D. trivittatus.*

Several specimens, ♂ ♀.

7. PHYLLOBATES TRILINEATUS, sp. n. (Plate LVIII. fig. 1.)

Snout obtuse, as long as the diameter of the eye; loreal region vertical; nostril slightly nearer the tip of the snout than the eye; interorbital space broader than than the upper eyelid; tympanum concealed. Fingers slender, moderately elongate, first extending beyond second, fourth extremely short; toes slender, with rudiment of web; disks small; subarticular tubercles feebly developed; two slightly prominent metatarsal tubercles. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches centre of eye. Skin perfectly smooth. Dark brown above, limbs marbled with lighter; a greyish streak from eye to groin on each side and a narrow vertebral line of the same colour; a white spot on each side of the vent, on hinder side of thighs; lower surfaces dirty white, throat grey. Male with a large external subgular vocal sac. From snout to vent 17 millim.

A single ♂ specimen.

8. Leptodactylus rubidus, Cope.

9. Leptodactylus rhodomystax, sp. n. (Plate LVIII. fig. 2.)

Tongue oval, slightly nicked behind. Vomerine teeth in two straight transverse series just behind the choanæ. Habit stout. Snout rounded, as long as the diameter of the orbit; nostril nearer the tip of the snout than the eye; interorbital space a little broader than the upper eyelid; tympanum two thirds the diameter of the eye. Fingers moderate, first longer than second; toes moderate, slightly fringed; tips of fingers and toes slightly swollen; subarticular tubercles well developed; two small metatarsal tubercles. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the shoulder. Skin smooth; a glandular lateral fold. Vinaceous brown above; the canthus rostralis, the lateral fold, a cross band between the eyes and another on interscapular region blackish; a band round the upper lip pinkish white; legs with rather indistinct dark cross bands; hinder side of thighs black, white-spotted; lower surfaces white, throat and breast marbled with greyish. From snout to vent 25 millim.

Two young specimens.

10. Leptodactylus discodactylus, sp. n. (Plate LVIII. fig. 3.)

Tongue oval, slightly nicked behind. Vomerine teeth in two straight transverse series behind the choanæ. Snout rounded, a little longer than the diameter of the orbit; nostril nearer the tip of the snout than the eye; interorbital space broader than the upper eyelid; tympanum two thirds the width of the eye. Fingers moderate, first not extending beyond second; toes slender, fringed; tips of fingers and toes dilated into small disks; subarticular tubercles well developed; two small metatarsal tubercles. The hind limb being carried forward along the body, the tibio-tarsal articulation reaches the anterior border of the eye. Skin perfectly smooth. Olive-brown above, with rather indistinct darker spots forming cross bands on the limbs; a dark cross band between the eyes; lower surfaces white, finely marbled with brown. From snout to vent 28 millim.

A single ♀ specimen.

11. Bufo typhonius, Laur.

12. Hyla lanciformis, Cope.

The single, full-grown, specimen is uniform dull olive above.

13. Hyla taurina, Fitz.

14. Hyla aurantiaca, Daud.

15. Hyla marmorata, Laur.

The lighter parts of the sides of the belly, axilla, lower surface of thighs, and interdigital membranes orange.

16. Hyla parviceps, Blgr.

17. Hyla rubra, Daud.

Loins, sides of thighs, and inner side of tibia and tarsus orange-yellow.

18. Phyllomedusa perlata, sp. n. (Plate LVIII. fig. 4.)

Tongue entire. Vomerine teeth none. Head very large; snout not longer than the diameter of the eye, vertically truncate; loreal region vertical; interorbital space much broader than the upper eyelid; tympanum rather indistinct, about half the diameter of the eye. Fingers free, first shorter than second, fourth shorter than third; toes free, first considerably longer than second; disks of fingers and toes small; metatarsal tubercles indistinct. The hind limb being carried forwards along the body, the tibio-tarsal articulation reaches hardly to the eye. Skin smooth above; parotoids large, flat; a series of small, pearl-like white tubercles from the eye to halfway down the body; belly and lower surface of thighs granulate. Purple above (green during life); a white, dark-edged line along outer border of forearm and tarsus; throat purple; lips white-bordered; the rest of the lower surfaces white. From snout to vent 23 millim.

A single young specimen.

4. On some Points in the Anatomy of *Phœnicopterus* and its Allies. By W. F. R. Weldon, B.A., Scholar of St. John's College, Cambridge, Assistant Demonstrator in the Morphological Laboratory of the University.

[Received December 6, 1883.]

(Plates LIX., LX.)

During the past summer I have had an opportunity of dissecting at the Society's Gardens a large number of Storks and a specimen of the European Flamingo (*Phœnicopterus antiquorum*), so that I have been able to make a detailed comparison between the soft parts of these creatures, the results of which I propose to describe in the following paper.

Respiratory System.

The *syrinx* of Storks has, as a rule, no intrinsic muscles; in *Leptoptilus*, which I shall take as a type, it has the following structure:—

The last four bronchial rings (fig. 1, A*b*.) are much enlarged,

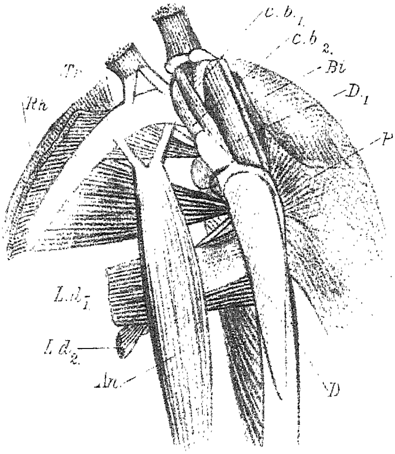


Fig.1

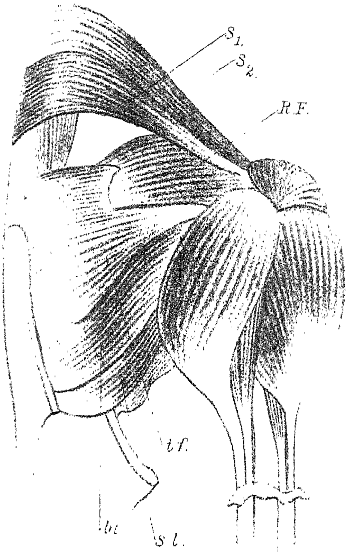


Fig.2.

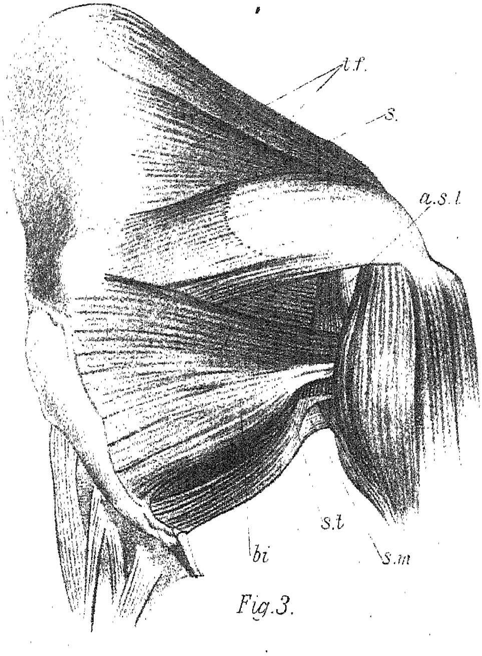


Fig.3.

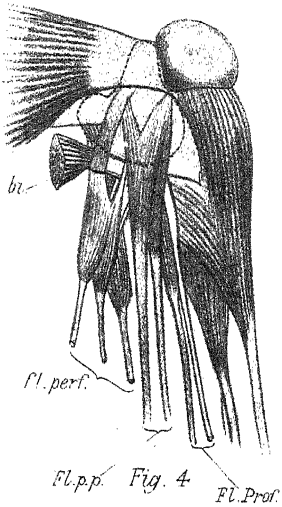


Fig. 4

W.F.R.Weldon ad nat. del.

Hanhart imp.

ANATOMY OF PHŒNICOPTERUS.

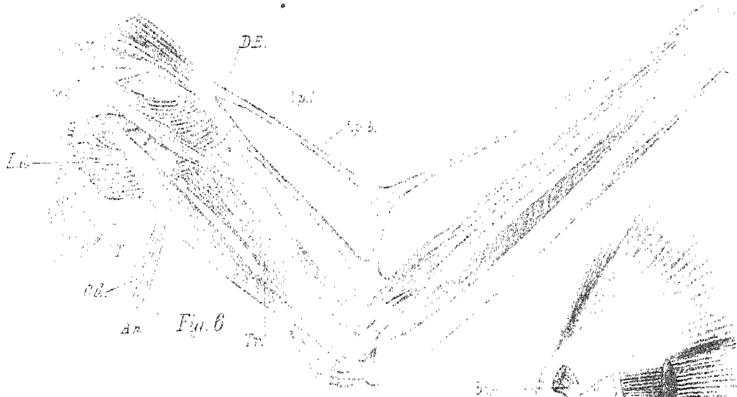


Fig. 6

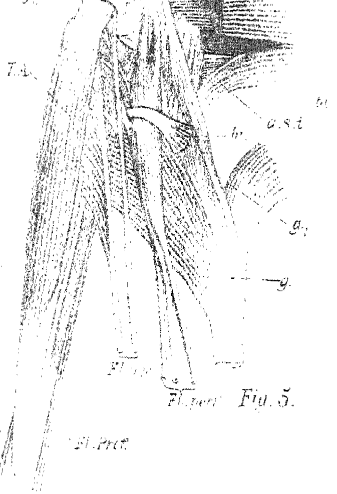


Fig. 5.

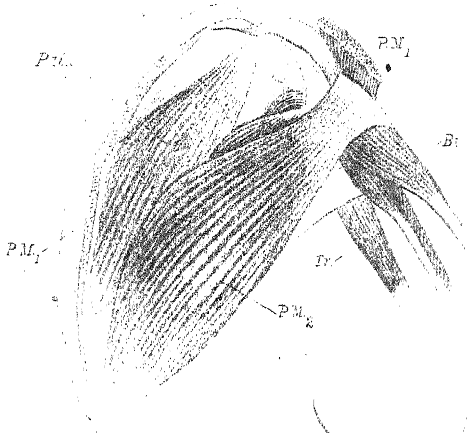


Fig. 7.

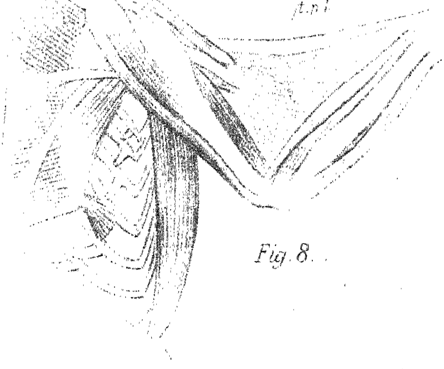


Fig. 8.

W. F. R. Weldon ad nat. del.

Hanhart imp.

ANATOMY OF PHŒNICOPTERUS.

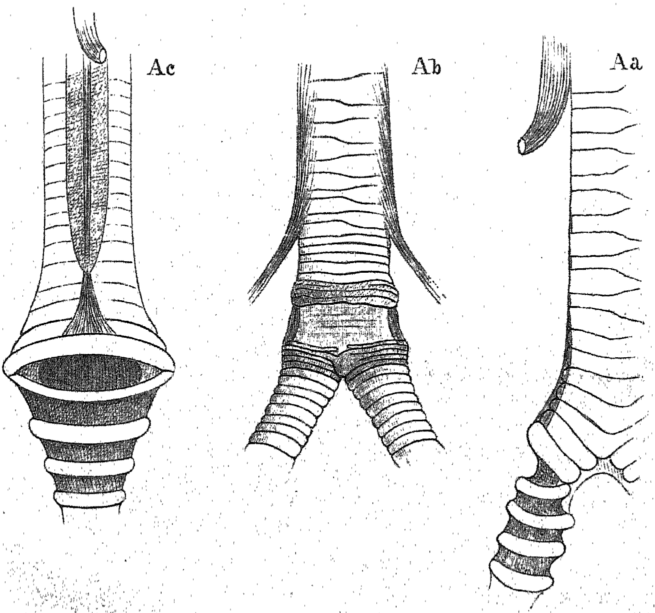
fused together, and calcified, the fourth being incomplete behind. Above these are eight or nine rings, which are also incomplete posteriorly; so that above the syrinx there is at the back of the trachea an elongated membranous space.

Below the last tracheal ring there is a membranous tube, connecting the last tracheal with the first bronchial rings. Of these the first is incomplete internally, both in front and behind; while the next three are thickened, and join a large *pessulus* in the middle line.

Both the pessulus and the first four bronchial rings are complete.

In *Phœnicopterus* the last three bronchial rings are calcified and ankylosed; there is no pessulus, and the first twenty bronchial rings are incomplete internally. There is also a single pair of intrinsic muscles (fig. 1, A*a*, A*c*).

Fig. 1.



Diagrams of the syrinx of *Leptoptilus* and *Phœnicopterus*.
A*a*, Front, and A*c*, side view of that of *Phœnicopterus*; A*b*, front view of that of *Leptoptilus*.

The *lungs* present nothing remarkable, but the *air-cells* and their associated septa are strikingly characteristic.

On slitting open the abdominal wall of a Stork (*Leptoptilus*, for example) in the middle ventral line, the only viscera exposed are the two lobes of the liver and the ventral portion of the gizzard. All the rest are hidden by a thick horizontal septum of connective tissue stretching across the whole body-cavity from the pericardium to the cloaca. The attachments of this septum are, *anteriorly*, to the posterior margin of the pericardium; *laterally*, to the side walls of the abdomen, just ventral to the line of attachment of the oblique septum; and *posteriorly*, to the body-wall just ventral to the anus.

The liver is, as has been said, entirely ventral to this septum, while the stomach perforates it.

The *umbilical ligament* is converted into a strong vertical septum, running between the lobes of the liver, and extending anteriorly to the pericardium, posteriorly to the middle of the gizzard (fig. 6, *v. sep.*).

This arrangement of septa is found in all the Storks I have dissected [1], and is exactly repeated in *Phœnicopterus*, while I have not found it in any other birds. In all the Anatidæ, for example, the representative of the horizontal septum is attached to the ventral abdominal wall, almost immediately behind the liver, so that it does not cover any of the intestinal coils [2].

The arrangement above described is associated, both in *Phœnicopterus* and the Storks, with a peculiarity in the air-cells themselves.

The *pulmonary aponeurosis* [3] is not muscular.

The *præbronchial air-cells* vary greatly in size, and are divided by a complicated arrangement of transverse septa into smaller chambers; in *Leptoptilus* there are five such chambers in each cell, in *Phœnicopterus* four. This divided condition is not dependent on the size of the cells, because in *Phœnicopterus*, where they are small and deeply buried among the muscles of the neck, the dividing septa are as well developed as in the Adjutant, where each air-cell extends nearly a third of the way up the neck.

The *subbronchial cells* are completely fused, no trace of the original partition remaining. The fused cells project forwards between the clavicles, from which a small horizontal septum projects, partially dividing a præclavicular from a postclavicular portion.

The præclavicular portion is compressed by a muscle, which radiates over its outer surface from the clavicle.

The anterior and posterior intermediate cells present nothing remarkable, their relations being sufficiently shown. Indeed the condition of these cells seems, so far as I have been able to ascertain, to be singularly constant in all birds.

The *abdominal cells* are very large, extending to the extreme end of the body. The oblique septum, in the abdominal region, is attached to the vertebræ very near the middle line; passing ventralwards, the two septa diverge, forming a chamber in which lie the intestines, below which they again converge to meet in the middle ventral line.

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[1] *Leptoptilus argala* and *javanicus*; *Ciconia nigra* and *C. maguari*; *Mycteria americana*; *Tantalus* sp.?; *Carphibis spinicollis*; *Xenorhynchus senegalensis*.

[2] This septum has been mentioned by various authors; but, so far as I am aware, no special name has been applied to it. From its resemblance to a modified Mammalian mesentery, I would propose to call it "*pseudepiploön*."

[3] For an explanation of the terms used in describing air-cells, see Huxley, "On the Respiratory Organs of *Apteryx*," P. Z. S. 1882, p. 560 *et seq.*

In the Anatidæ the præbronchial cells are never divided in the way above described, and the abdominal cells are much smaller, not extending so far back, and not meeting below the intestines[1]—these two points, together with the condition of the horizontal septum, being, I believe, absolutely characteristic of the Storks.

The characters of the Alimentary System have been already described by Gadow[2], who has insisted on the resemblances between the Flamingo and the Stork; I have therefore nothing to add to his description.

The *muscular system* has, however, not been described in detail, either for Storks or for *Phœnicopterus*. I propose therefore to describe first the limb-muscles of *Leptoptilus argala*, which is fairly typical, and afterwards to point out the chief differences in the Flamingo.

A. Muscles of Fore Limb.

1. The *latissimus dorsi* is divided, as usual, into two. The posterior division arises from the last two free dorsal vertebræ, and by a slip from the corner of the scapula; it forms a fleshy belly, tapering gradually to a point, and ending in two tendons, one of which goes to the humerus, the other to the belly of the *anconeus longus*. This muscle is connected by an aponeurosis with the *anterior division* which goes straight from the 3rd, 4th, and 5th dorsal vertebræ to the humerus.

2. The *trapezius* (Plate LX. fig. 7, *Tr.*) is very small, arising from the spines of the last two cervical vertebræ only, and going to the dorsal half of the clavicle. The posterior margin of this muscle sends off a small slip to the *latissimus dorsi*.

3. The *rhomboideus superior* arises from the spine of the fourth dorsal vertebra, beneath the latissimus dorsi, and is inserted into the vertebral border of the scapula. Beneath this muscle, and connected with it at its origin, is a flat, thin tendon, $\frac{3}{8}$ inch broad, going to the posterior angle of the scapula.

4. The *rhomboideus inferior* arises from the spines of the last cervical and first four dorsal vertebræ, and is attached to nearly the whole vertebral border of the scapula.

5. The *serratus magnus* arises by two fleshy digitations from aponeurosis between ribs 2, 3, and 4, just ventral to the uncinate process. It is inserted by a thin flat tendon to half an inch of the vertebral border of the scapula.

6. The *levator scapulæ* arises from the last cervical and first two dorsal ribs, and is inserted into the posterior two thirds of the deep surface of the scapula.

7. *Tensor patagii brevis* (Plate LX. fig. 6, *t.p.b.*) arises by a fleshy origin from the dorsal part of the clavicle, and gives off a belly three

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[1] Huxley (*loc. cit.*) has described the arrangement in the Duck; and I have found a similar state of things to obtain in many Anatidæ.

[2] Verdauungssystem d. Vögel: 'Jenaische Zeitschrift.'

inches long, after which it ends in a tendon. At the junction of the belly with the tendon, a tendinous slip is given off to the humerus. The tendon runs down, at a small angle with the humerus, and joins the aponeurosis over the extensor carpi radialis, where it receives a slip from the tensor patagii longus tendon.

8. The *tensor patagii longus* is fused at its origin with the *pectoralis major*, and after leaving this it fuses for a short distance with the fleshy part of the *tensor brevis*. The tendon runs straight to the radial carpal bone, giving off about the middle of the patagium a slip to the aponeurosis over the flexor carpi radialis.

The result of the arrangements described is, that the tendons of the patagial tensors form a very characteristic figure, shown in fig. 8.

9. The *coracobrachialis externus* arises from the tip of the clavicle dorsal to the tensor patagii brevis; it runs above the coracobrachialis internus, to be inserted into the middle of the great humeral crest.

10. The *coracobrachialis internus* is very small; it arises from the tip of the coracoid, just ventral to the coraco-scapular articulation, and passes over the tendon of the second pectoral to the crest of the humerus.

11. The *external deltoid* arises by a short flat tendon from the outer face of the scapula, close to the coracoid articulation; it runs straight to the humerus, into the dorsal face of the crest of which it has an elongated triangular insertion. Close to the origin a second tendon is given off to the scapula (Plate LIX. fig. 1, D, Plate LX. fig. 6, DE).

12. The *deltoides internus* arises from the tip of the coracoid, external to the long tendon of the biceps, and goes to the ventral side of the humeral crest (Plate LIX. fig. 1, D*i*).

13. The *triceps* arises from the whole posterior face of the humerus, below the pneumatic foramen; it is fleshy for nearly its whole length, but ends below in a short tendon inserted into the olecranon.

14. The *pectoralis major* arises by three heads, the fibres of which are all tolerably distinct:—(1) The *superficial head* arises from the margin of the clavicle ventral to the origin of the *tensor patagii brevis*, from the extreme edge of the carina of the sternum along its whole length, and from the whole side posteriorly. The fibres of this head are continuous posteriorly with (2) the *posterior deep head*, which arises from the ventral third of the clavicle, and from the carina beneath the first head. (3) The *anterior deep head* arises from the ventral face of the sternum beneath (2), and from a small piece of clavicle.

These various fibres are inserted in a somewhat complicated manner on the head of the humerus. Those from the anterior deep head, remaining quite distinct from the rest, form a strong tendon, which is attached to a tubercle at the base of the deltoid crest of the humerus. From the junction between this muscle and its tendon, a strong ligament passes to the head of the coracoid. From the posterior edge of this tendon, a strong aponeurosis passes over the internal deltoid and biceps, to be inserted into the inner side of the humerus; and to this aponeurosis are attached the remaining fibres of the pectoralis.

15. The *second pectoral* occupies about three quarters of the ventral face of the sternum; it also arises from the proximal half of the coracoid, and from nearly the whole of the coraco-clavicular membrane. Its tendon passes as usual over the scapula to go to the lesser tuberosity of the humerus, at the top of the deltoid ridge.

16. The *third pectoral* is relatively small; it arises from the lower third of the posterior margin of the coracoid, and passes to the tip of the great tuberosity of the humerus.

17. The *biceps* arises by two heads—a long tendon from the head of the coracoid, and a fleshy head from the lower surface of the pectoral aponeurosis.

18. The *supraspinatus* arises from the anterior half of the ventral border of the scapula, and is attached to the great tuberosity of the humerus, just anteriorly to the tendon of the *pectoralis tertius.*

19. The *subscapularis* arises from the anterior half of the deep surface of the scapula, being inserted into the great tuberosity of the humerus below the tendons of the third pectoral and supraspinatus.

20. The *extensor carpi radialis longus* arises by fleshy fibres from the ridge above the outer condyle of the humerus, and forms a short fleshy belly, which joins a long tendon, passing first over a groove in the distal head of the radius, and then over the middle of three grooves on the face of the radial carpal, to be finally inserted into the tuberosity of the thumb metacarpal.

21. The *extensor carpi radialis brevis* arises by a short tendon from the outer condyle of the humerus; its short belly is attached to the aponeurosis covering the preceding muscle, and its tendon runs below the long extensor tendon to the thumb metacarpal.

22. The *abductor pollicis* arises by three slips—the first from the interosseous border of the radius for about a third of its length, beginning near the bicipital tuberosity; the second from the upper surface of the ulna, just beneath the head of the radius; and the third from a ridge on the ulna, just distal to the ulnar tendon of the biceps. The second and third slips unite before joining the first.

The tendon curves round to the outer side of the radius, and passes through the outer of three grooves on the radial carpal bone, to be inserted on the great tuberosity of the thumb metacarpal, below and external to the radial extensor of the carpus.

23. The *extensor carpi ulnaris* arises from the outer surface of the outer condyle of the humerus, superficially to all the other murcles which arise there; it is also attached to the outer side of the ulna. The belly is small, and the long tendon passes through a separate groove in the outer side of the ulna to the outer side of the second metacarpal.

24. The *adductor manus* arises from the fascia on the outer side of the head of the ulna, and passes to the inner edge of the third metarcarpal.

25. The *pronator quadratus* arises from the inner (palmar) surface

of the ulna through the distal fourth of its length, and passes over the dorsal groove in the radial carpal bone to the tubercle on the outer side of the thumb metacarpal.

26. The *flexor carpi ulnaris* arises from the inferior portion of the internal condyle of the humerus; it is fleshy for half its length, and then sends a tendon to the tubercle of the ulnar carpal.

27. The *extensor indicis et pollicis* arises from the outer condyle, and is inserted on the basal phalanx of the index finger, the tendon giving a branch to the thumb.

28. The *extensor proprius indicis* arises from two thirds of the distal half of the interosseous border of the radius; it crosses the tendon of the ext. ind. et poll. to go to the base of the distal phalanx of the index. About the middle of its course through the hand, the tendon is joined by a slender muscular slip arising from the capsule of the tarso-metatarsal joint.

29. *Flexor indicis* I arises from the deep surface of the proximal halfof the ulnar fascia, going over a groove in the ulna to the upper surface of the second phalanx of the index.

30. *Flexor indicis* II arises from the proximal half of the deep surface of the ulna, and goes to the base of the second phalanx of the index.

31. *Brachialis anticus* arises from the outer part of the anterior surface of the humerus, between the epicondylar ridges, and inserted to the inner margin of the ulna by a fleshy insertion two inches long.

32. The *pronator longus* has a tendinous origin, superficially to all other muscles, from the inner condyle of the humerus; its insertion into the humerus is very long.

33. *Pronator brevis* lies below the long pronator, and has similar attachments.

34. The *supinator* arises from the outer condyle above the extensor indicis et pollicis, and is inserted into about four inches of the superior margin of the radius.

35. The *extensor brevis pollicis* arises from the proximal dorsal tubercles of the thumb metacarpal, and goes to the dorsal edge of the base of its phalanx.

There are two abductors and one short flexor of the thumb.

B. Muscles of the Hind Limb.

1. The *sartorius* arises from the antero-inferior margin of the crista ilii, and is not attached to any dorsal vertebra; it is inserted into the tibia on the inner side of the triceps tendon.

2. The *tensor fasciæ* arises from the gluteal fascia in front of the acetabulum only in *Leptoptilus*, though in some Storks (*Ciconia*) its origin extends behind the acetabulum. It is inserted into the fascia covering the rectus femoris.

3. The *biceps* arises from nearly the whole of the postacetabular ridge of the ilium; its tendon, after passing through the usual sling, goes to the fibula, about two and a half inches below the head.

4. The *semitendinosus* is rather narrow; it arises from the tip of the postacetabular ridge of the ilium, and from the fascia between this and the pubis. It is inserted (1) into the tendon intersecting its accessorius; and (2) into a flat tendon which passes round the accessorius to join the tendon of the semimembranosus.

5. The *semimembranosus* arises from the hinder end of the ischium, and a small piece of the pubis. Its flat tendon receives, as has already been said, the tendon of the preceding muscle.

6. The *accessory semitendinosus* arises from the point of insertion into the femur of the great adductors; it then goes to the tendon already mentioned, which receives on one side the semitendinosus, on the other its accessorius, and finally goes to join the middle head of the gastrocnemius.

7. The *ambiens* is small; it has the normal relations described by Garrod.

8. There are three glutei, all of which are large.

9. The *obturator externus* arises from the anterior half of the ischium behind the postacetabular foramen. Its origin is fleshy; its upper surface is tendinous, covered by a thick and strong aponeurosis.

10. The *obturator internus* has an oval origin; round its tendon there is, as usual in birds, a single representative of the gemelli.

11. The *adductor longus* is attached to the ischium behind the obturator foramen; it is inserted into the linea aspera along the distal three fourths of the femur, the ventral face of the inner condyle, the capsular ligament of the knee-joint, and the head of the tibia.

12. The *adductor magnus* arises from the external face of the adductor longus; it is inserted along the outer edge of the middle third of the linea aspera, where it fuses with the accessory semitendinosus.

13. The *pectineus* arises just internal to the gluteus quartus and is inserted on the inner side of the femur, between the rectus and vastus internus.

14. The *quadriceps femoris* is made up of a fused *rectus* and *vastus externus*, the *vastus internus* being distinct. The last-named muscle, as well as joining the common tendon at the patella, has a small separate tendon going to the *outer* side of the tibial crest.

15. The *gastrocnemius* arises by three heads:—(*a*) the *inner* arises from the tendon of the *rectus*, from the fascia covering the inner surface of the *tibialis anticus*, and from the cnemial crest of the tibia. It forms a large fleshy belly, which remains distinct from the rest of the muscle till the tendo Achillis.

(*b*) The *middle* head arises by a flat narrow tendon between the condyles of the femur; it then forms a small belly, joined by the accessory semitendinosus, and then going to the outer head.

(*c*) The *outer head* has a very short thin tendon arising from the outer condyle of the femur, between the biceps sling and the origin of the flexor perforatus et perforans.

The result of this arrangement is that the muscle has a very curious shape, shown in the accompanying woodcut.

16. The *flexor perforatus et perforans* arises by two heads—one from the outer condyle of the femur, just distal to the outer head of the gastrocnemius, and one from the fascia over the peroneus longus: the two heads are connected by a tendinous intersection. The two heads give rise to two separate tendons, which pass the ankle-joint on the inner side of the leg, just below the tendo Achillis. They supply the second and third digits.

17. The *flexor perforatus* arises from the femur by a flat tendon from the inner condyle, and by a fleshy head from the outer: these heads unite to form a fleshy belly, which receives two slips from the flexor perforatus et perforans. After receiving these slips the muscle splits into three tendons, which at the annular ligament are internal to the tendons of the flexor last described, and superficial to those of the flexor profundus.

18. The *flexor profundus* arises from the whole length of the fibula and the adjacent parts of the tibia. Above, the tibial and fibular portions are more or less distinctly separable; and further down the belly the separation is continued by a tendinous raphe. There is a single tendon, which passes through the annular ligament below all the others.

19. The *flexor longus pollicis* has the typical arrangement called "ciconine" by Garrod.

20. The *peroneus longus* arises from the crest of the tibia and from the fascia covering the tibialis anticus; also from the fascia between itself and the head of the gastrocnemius. All these origins are fleshy. A broad, flat tendon passes to the outside of the leg, at the ankle, through a special groove in the outer malleolus of the tibio-tarsus, joining the tendon of the flexor perforatus about a third of the way down the tarso-metatarse. Just before passing the ankle-joint the tendon gives off a broad flat ligament to the tibia.

There is no peroneus brevis.

21. The *tibialis anticus* arises from the outer condyle of the femur, from the upper and outer side of the cnemial crest of the tibia, and from the aponeurosis covering the extensor communis digitorum. The tendon passes superficially through the anterior annular ligament, and is inserted into a pit in the tarso-metatarsus about an inch below the joint.

22. The *extensor communis digitorum* has a fleshy triangular origin from the inner border of the anterior face of the tibia for about five inches: its tendon is first beneath, then internal to that of the *tibialis anticus*, and supplies the second, third, and fourth digits, but not the thumb.

23. The *plantaris* arises from the inner side of the posterior surface of the tibia for about an inch; its belly is very small; and its long slender tendon is inserted into the deep surface of the annular ligament.

24. There are two poplitei.

The short muscles of the foot are an abductor, an abductor indicis, a small flexor of the middle finger, and an abductor minimi digiti, on the dorsal side: on the ventral side are a short flexor of the hallux, and a short flexor of the second toe.

The foregoing account, without making any pretence to completeness, may serve as a standard of comparison in considering the myological affinities of the Flamingo.

In the fore limb this animal agrees so closely with the Storks that it would be useless to go into any detailed description of its wing-muscles.

The most important points of agreement, however, are the features of the pectoralis major and of the tendons of the *tensores patagii*. In Storks it is well known that the pectoralis major is divided into two or more layers, easily separable from one another, and that its attachment to the humerus forms a tendinous arch beneath which the brachial muscles pass from the coracoid to the arm. In *Phœnicopterus* Gadow[1] has shown that these features are exactly repeated ; and in Plate LX. fig. 7 I have drawn a specimen in which it seems as if there were actually two distinct great pectorals I need hardly point out that this condition is absolutely unknown among Lamellirostres.

Fig. 2.

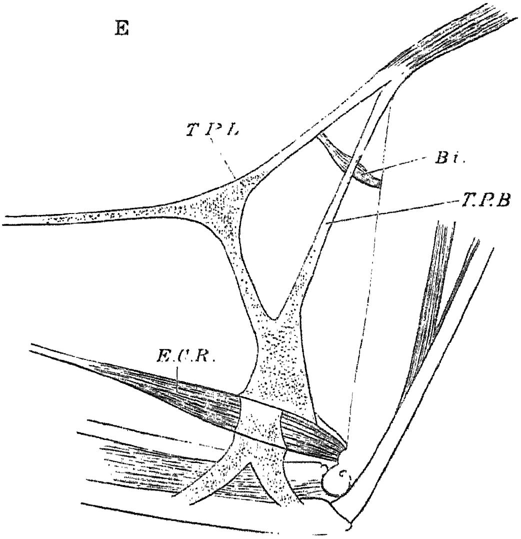

Diagram of tensores patagii in *Phœnicopterus*.

The *tensores patagii* form in *Phœnicopterus* almost exactly the same figure as that found in Storks, as will be seen at once by comparing fig. 2, E with Plate LX. fig. 6 ; while in the Duck, for example (see Plate LX. fig. 8), there is a marked difference from this type, neither tendon sending a slip down to the flexor carpi radialis, and the whole triangle of the patagium being filled by a strong, even aponeurosis.

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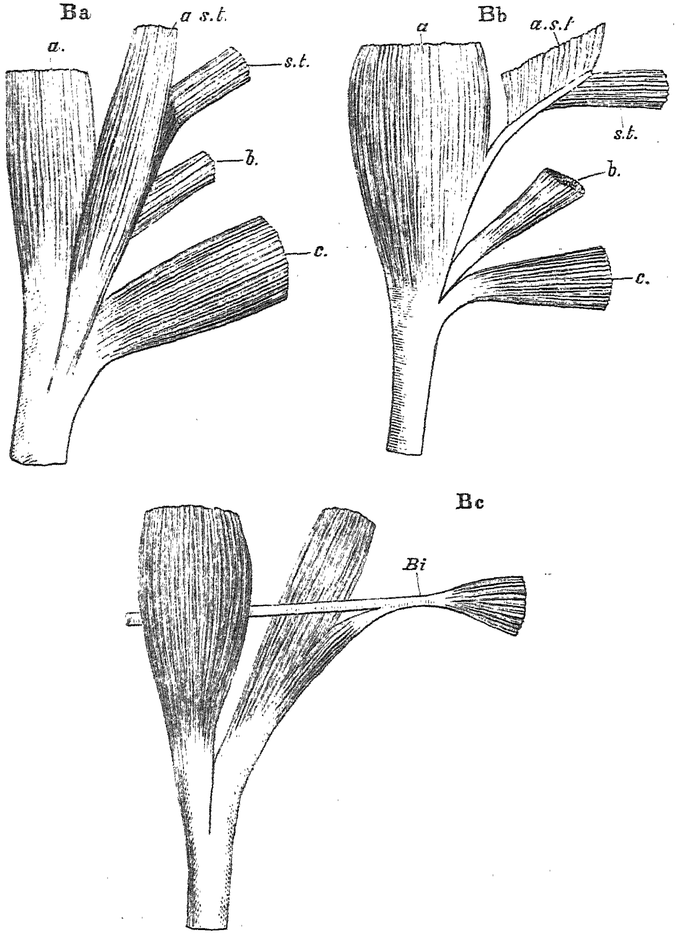
[1] Journ. f. Ornithol. 1878.

In the leg the agreement is not quite so close, the Flamingo having many muscular features of its own; but in those points in

Fig. 3.



Gastrocnemius and connexions: B*a*, in *Leptoptilus*, B*b*, in *Phœnicopterus*, B*c*, in the Duck.

a, inner, *b*, middle, *c*, outer head of gastrocnemius; *s.t*, semitendinosus; *a.s.t.*, its accessorius. In the Duck, *Bi*, biceps.

which it does resemble other forms, it tends much more to the Ciconine than to the Anserine type.

The *sartorius* is peculiar in being split up into three distinct portions, separate in origin and insertion, but so situated that each has almost all the relations of the typical sartorius.

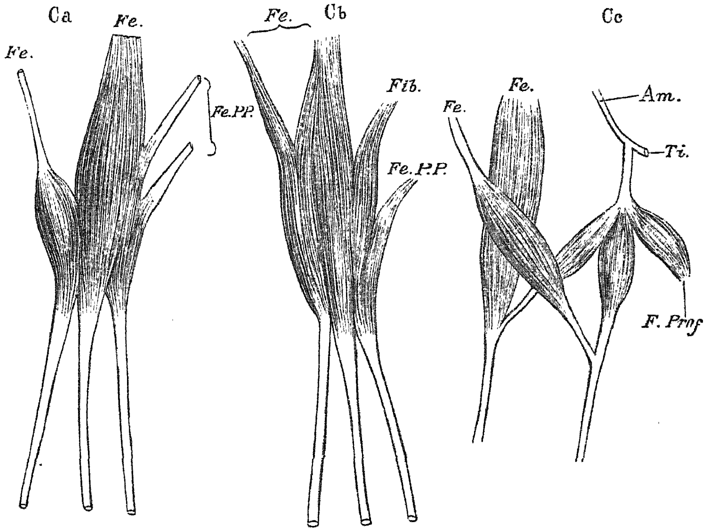
Of the *tensor fasciæ* only the post-acetabular portion is left.

The *biceps*, *semimembranosus*, and *semitendinosus* closely resemble those of the Storks, as does also the mode of union of the accessory semitendinosus with the gastrocnemius.

There are two distinct *adductors*, as in Storks, while in many, if not in all, Geese there is only one.

The *ambiens* is small, and simply joins the flexor perforatus in the leg; while in Anatidæ it acquires a connexion with the tibia on the one hand, and with both the flexors on the other.

Fig. 4.



Diagrams of origin of *flexor perforatus*: *Ca*, in *Leptoptilus*, *Cb*, in *Phœnicopterus*, *Cc*, in the Duck.

Fe, Attachment to femur; *Fe.P.P*, slips to flexor perforatus et perforans. In Duck, *Am.*, ambiens tendon; *Ti.*, its tibial insertion; *F.Prof.*, one belly of flexor profundus.

The three-headed origin of the *gastrocnemius*, and its mode of union with the *accessory semitendinosus* are also essentially Stork-like. In the Duck, for example, where there is no accessory semitendinosus, there are only *two* heads to the gastrocnemius, the inner of which receives a muscular slip from the tendon of the biceps.

These relations will be easily understood on comparing in fig. 3, p. 648, B*a* and B*b* with B*c*.

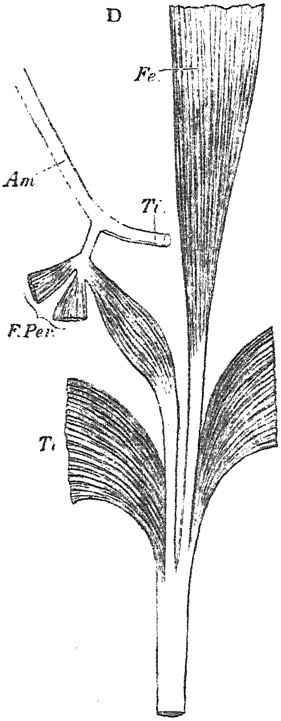
The *long flexors of the leg* are also very Stork-like.

The *flexor perforatus* in *Phœnicopterus* arises by four heads, one of which is fused with the flexor perforatus et perforans. This mode of origin is very similar to that of Storks; while in the Duck, for example, there are two heads attached to the femur, and a third to the ambiens tendon.

These conditions are shown in fig. 4, p. 649.

The *flexor profundus* is perfectly simple both in Storks and in the Flamingo; while in the Ducks (fig. 5) it has a complicated origin by four heads—namely, one from the femur, one from the outer and one from the inner side of the tibia, and one from the ambiens tendon, which does *not* simply fuse with the belly of the flexor, but goes to the tibia, and gives attachment to two distinct fleshy bellies, one for each long flexor.

Fig. 5.



Origin of flexor profundus in Duck.
Ti., insertions to tibia; other letters as in fig. 4.

The accessory femoro-caudal of *Phœnicopterus* is extremely small; and the possession of this muscle together with the absence of a

Mar. 17. 4 Chilian Pintails (*Dafila spinicauda*), 4 ♂. Purchased.
2 Bahama Ducks (*Dafila bahamensis*), 1 ♂ and 2 ♀. Purchased.
2 Chiloe Wigeons (*Mareca chiloensis*), ♂ and ♀. Purchased.
4 Shovellers (*Spatula clypeata*), 1 ♂ and 3 ♀. Purchased.
9 Summer Ducks (*Aix sponsa*), 3 ♂ and 6 ♀. Purchased.
6 Mandarin Ducks (*Aix galericulata*), 2 ♂ and 4 ♀. Purchased.
18. 6 Common Trout (*Salmo fario*). Presented by Mr. Stanley Wilson.
19. 6 Common Squirrels (*Sciurus vulgaris*). Purchased.
2 Robben-Island Snakes (*Coronella phocarum*). Purchased.
20. 1 Black-headed Lemur (*Lemur brunneus*). Purchased.
21. 3 Sirens (*Siren lacertina*). Presented by Dr. G. E. Manigault, C.M.Z.S. See P.Z.S. 1883, p. 178.
22. 1 Gayal (*Bibos frontalis*), ♂. Born in the Menagerie.
24. 1 Common Wigeon (*Mareca penelope*), ♂. Presented by Lieut.-Col. C. Birch Reynardson.
27. 1 Olive Weaver-bird (*Hyphantornis capensis*). Presented by Mr. Edward Ling.
28. 1 Sambur Deer (*Cervus aristotelis*), ♀. Born in the Menagerie.
29. 1 Axis Deer (*Cervus axis*), ♀. Born in the Menagerie.
2 Sea-Mice (*Aphrodite aculeata*). Presented by Mrs. A. Browning-Priestley.
30. 1 Sharp-tailed Grouse (*Tetrao phasianellus*). Presented by Henry Nash, Esq.
1 Red-vented Parrot (*Pionus menstruus*). Purchased.
2 Bonnet-Monkeys (*Macacus sinicus*), ♂ and ♀. Deposited.
31. 1 Arabian Baboon (*Cynocephalus hamadryas*), ♀. Presented by Mr. T. E. Goodner.
1 Grey Teetee (*Callithrix gigo*), ♀. Purchased. See P.Z.S. 1883, p. 178.
1 Grey Lemur (*Hapalemur griseus*), ♂. Purchased. See P.Z.S. 1883, p. 178.
1 Long-eared Fox (*Otocyon lalandii*). Purchased.

April 2. 1 Common Squirrel (*Sciurus vulgaris*), ♀. Presented by Miss A. M. Frost.
3. 1 Common Pintail (*Dafila acuta*), ♂. Presented by Frank Seago, Esq.
4. 1 Red-headed Woodpecker (*Melanerpes erythrocephalus*). Purchased.
1 Radiated Tortoise (*Testudo radiata*). Presented by Com. Marks, R.N.
1 Black Saki (*Pithecia satanas*), ♀. Purchased.
1 Brazilian Blue Grosbeak (*Guiraca cærulea*). Purchased.
1 White-bellied Parrot (*Caica leucogastra*). Purchased.
4 Harlequin Quails (*Coturnix histrionica*), 2 ♂ and 2 ♀. Purchased.
1 Talapoin Monkey (*Cercopithecus talapoin*), ♂. Purchased.
4 Saffron Finches (*Sycalis flaveola*), 3 ♂ and 1 ♀. Purchased.
5. 1 Grey Lag Goose (*Anser ferus*). Presented by Vincent W. Corbett, Esq.
4 Palmated Newts (*Triton palmipes*). Presented by Mr. J. E. Kelsall.
6. 1 Leonine Monkey (*Macacus leoninus*), ♂. Presented by A. G. Henry, Esq.
6. 1 Mule Deer (*Cervus macrotis*), ♀. Presented by Dr. Caton, C.M.Z.S. See P.Z.S. 1883, p. 346.

April 9. 1 Common Raven (*Corvus corax*). Presented by the Earl of Eldon.
2 White-fronted Capuchin Monkeys (*Cebus albifrons*), ♂ and ♀. Presented by Mr. H. Smith.
2 Amherst's Pheasants (*Thaumalea amherstiæ*), ♂ and ♀. Deposited.
2 Reeves's Pheasants (*Phasianus reevesi*), ♂ and ♀. Purchased.
10. 3 Lions (*Felis leo*), 1 ♂ and 2 ♀. Purchased.
1 Great Black Cockatoo (*Microglossa aterrima*). Purchased. See P.Z.S. 1883, p. 346.
1 Lanner Falcon (*Falco lanarius*). Presented by Major J. H. Hussey.
1 Common Otter (*Lutra vulgaris*), ♂. Purchased.
5 Mississippi Alligators (*Alligator mississippiensis*). Presented by Thomas Baring, Esq.
3 Wall-Lizards (*Lacerta muralis*). Presented by Henry Garle, Esq., F.Z.S.
2 Common Snakes (*Tropidonotus natrix*). Presented by Lord Londesborough, F.Z.S.
11. 1 Rough Fox (*Canis rudis*). Presented by G. H. Hawtayne, Esq., C.M.Z.S. From Guiana.
1 Arabian Gazelle (*Gazella arabica*), ♀. Presented by J. Sewell, Esq.
1 White-backed Piping Crow (*Gymnorhina leuconota*). Purchased.
12. 1 Wood-Owl (*Syrnium aluco*). Presented by Capt. E. Hall.
14. 3 Weasels (*Mustela vulgaris*). Presented by Mr. George Lang.
1 Palmated Newt (*Triton palmipes*). Presented by Mr. J. E. Kelsall.
16. 1 Leopard (*Felis pardus*), ♀. Presented by A. P. Marsden, Esq.
1 Leopard (*Felis pardus*), ♂. Deposited.
1 Ring-tailed Coati (*Nasua rufa*). Presented by Mr. E. Dance.
1 Gannet (*Sula bassana*). Deposited.
17. 1 Small Hill-Mynah (*Gracula religiosa*). Deposited.
18. 1 Greater Sulphur-crested Cockatoo (*Cacactua galerita*). Deposited.
19. 1 Ocelot (*Felis pardalis*). Presented by C. G. Leith, Esq.
1 Bluish Shrew (*Crocidura cærulescens*). Purchased. See P.Z.S. 1883, p. 346.
1 Iceland Falcon (*Falco islandus*). Purchased.
20. 2 Porto Rico Pigeons (*Columba corensis*). Presented by C. A. Craven, Esq., C.M.Z.S.
1 Common Boa (*Boa constrictor*). Presented by William Paterson, Esq.
1 Osprey (*Pandion haliaetus*). Presented by Dr. Plummer.
21. 1 White-bellied Sea-Eagle (*Haliaetus leucogaster*). Presented by the Hon. W. Macleay.
1 Stair's Ground-Dove (*Phlegœnas stairi*). Presented by E. P. Ramsay, Esq., C.M.Z.S.
2 Common Rheas (*Rhea americana*). Presented by John Fair, Esq.
1 Green Turtle (*Chelone viridis*). Presented by Fleetwood Sandeman, Esq., F.Z.S.
1 White Gannet (*Sula piscator*). Deposited.
23. 1 Ashy-black Macaque (*Macacus ocreatus*). Deposited.
6 Brown Newts (*Spelerpes fuscus*). Presented by Prof. H. H. Giglioli, C.M.Z.S.

April 24. 1 Great Ant-eater (*Myrmecophaga jubata*). Purchased.

1 Leopard (*Felis pardus*), ♂. Presented by Capt. Percy Luxmore, R.N., C.B.

1 Ring-tailed Coati (*Nasua rufa*). Presented by Dudley Sheridan, Esq.

1 Macaque Monkey (*Macacus cynomolgus*), ♂. Presented by H. G. Wainwright, Esq.

25. 1 Brown Bear (*Ursus arctos*), ♂. Presented by C. T. Kettlewell, Esq.

26. 2 Edible Snails (*Helix pomatia*). Presented by Lieut.-Col. C. S. Sturt, C.M.Z.S.

27. 1 Common Badger (*Meles taxus*). Presented by J. Snowdon Henry, Esq., F.Z.S.

1 Senegal Parrot (*Pœocephalus senegalensis*). Deposited.

1 Common Sparrow-Hawk (*Accipiter nisus*), ♂. Purchased.

28. 1 Woodcock (*Scolopax rusticula*). Presented by Capt. Nicholls.

30. 1 Eland (*Oreas canna*), ♀. Born in the Menagerie.

3 Indian Gazelles (*Gazella bennetti*). Presented by Capt. H. G. Hope Edwards.

2 Horned Lizards (*Phrynosoma cornutum*). Presented by John G. Witte, Esq.

May 2. 1 Common Kestrel (*Tinnunculus alaudarius*). Presented by A. Lidbury, Esq.

1 Wood-Owl (*Syrnium aluco*). Presented by Mrs. W. Duncan.

3. 1 Common Rhea (*Rhea americana*). Presented by F. R. S. Balfour, Esq.

4. 1 Macaque Monkey (*Macacus cynomolgus*), ♂. Presented by Mrs. Florence A. Hill.

1 Black Wolf (*Canis niger*), ♂. Presented by Major Frederick Clowes to the Zoological Gardens, Calcutta, from which institution it was received in exchange.

5. 2 Natterjack Toads (*Bufo calamita*). Purchased.

4 Marbled Newts (*Molge marmoratus*). Purchased.

4 Alpine Newts (*Molge alpestris*). Purchased.

4 Short-nosed Sea-Horses (*Hippocamus antiquorum*). Purchased.

A Collection of Sea-Anemones. Purchased.

2 Viverrine Cats (*Felis viverrina*). Deposited.

1 Indian Otter (*Lutra nair*). Deposited.

1 Indian Darter (*Plotus melanogaster*). Deposited.

1 Hamilton's Terrapin (*Clemmys hamiltoni*). Deposited.

3 Thurgi Terrapins (*Clemmys thurgi*). Deposited.

1 Amboina Box-Tortoise (*Cuora amboinensis*). Deposited.

6. 2 Beavers (*Castor canadensis*). Deposited.

7. 1 Bennett's Wallaby (*Halmaturus bennetti*), ♀. Born in the Menagerie.

1 Bladder-nosed Seal (*Cystophora cristata*). Deposited.

8. 1 Yellow-whiskered Lemur (*Lemur xanthomystax*). Purchased.

1 Herring-Gull (*Larus argentatus*). Presented by Mrs. Andrews.

1 Cocteau's Skink (*Macroscincus cocteauii*). Presented by Edmund E. St. Aubyn, Esq.

1 Carpet-Viper (*Echis carinata*). Presented by Col. C. S. Sturt, C.M.Z.S.

1 Crowned Snake (*Zamenis diadema*). Presented by Col. C. S. Sturt, C.M.Z.S.

May 8. 1 Smooth Snake (*Coronella lævis*). Presented by Mr. W. H. B. Pain.
9. 1 Long-fronted Gerbille (*Gerbillus longifrons*). Born in the Menagerie.
1 Bonnet-Monkey (*Macacus sinicus*). Presented by Mr. F. J. Wicks.
11. 1 Ring-tailed Coati (*Nasua rufa*). Presented by Ernest Francis, Esq.
1 Kinkajou (*Cercoleptes caudivolvulus*). Presented by Ernest Francis, Esq.
1 Bateleur Eagle (*Helotarsus ecaudatus*). Purchased.
12. 2 Germain's Peacock Pheasants (*Polyplectron germaini*), ♂ and ♀. Purchased.
15. 1 Herring-Gull (*Larus argentatus*). Deposited.
16. 1 King Vulture (*Gypagus papa*). Purchased.
2 Green Monkeys (*Cercopithecus callitrichus*). Presented by T. H. Dixon, Esq.
1 Long-eared Owl (*Asio otus*). Presented by the Rev. H. D. Grantham.
17. 1 Smooth Snake (*Coronella lævis*). Presented by Mr. W. H. B. Pain.
1 Proteus (*Proteus anguinus*). Presented by Miss Maud Howard.
18. 1 Cabot's Tragopan (*Ceriornis caboti*), ♀. Purchased. See P.Z.S. 1883, p. 388.
7 Black-and-Yellow Cyclodus (*Cyclodus nigroluteus*). Presented by Baron Ferdinand von Mueller, C.M.Z.S.
19. 3 Green-winged Doves (*Chalcophaps indica*). Deposited.
21. 2 Grisons (*Galictis vittata*). Presented by P. K. Slaney, Esq.
2 Welsh Sheep (*Ovis aries*), ♂ ♀. Deposited.
1 Grey-headed Porphyrio (*Porphyrio poliocephala*). Purchased.
22. 1 Hybrid Tapir (between *Tapirus roulini* ♂ and *Tapirus americanus* ♀), ♀. Born in the Menagerie.
1 Corn-Crake (*Crex pratensis*). Presented by J. H. Gurney, Esq., F.Z.S.
1 Common Chameleon (*Chamæleon vulgaris*). Presented by H. W. Weguelin, Esq.
1 Conical Worm-Snake (*Gongylophis conicus*). Purchased.
1 Surucucu or Bush-master (*Lachesis mutus*). Presented by J. Y. Barkley, Esq. See P.Z.S. 1883, p. 388.
23. 1 Chimpanzee (*Anthropopithecus troglodytes*), ♂. Deposited.
4 Pygmy Hogs (*Porcula salvania*). Born in the Menagerie. See P.Z.S. 1883, p. 388, pl. xliii.
1 Goffin's Cockatoo (*Cacatua goffini*). Deposited.
24. 1 Malbrouck Monkey (*Cercopithecus cynosurus*), ♂. Presented by C. D. Gordon, Esq.
2 Sloth Bears (*Melursus labiatus*). Presented by F. A. Curteis, Esq.
1 Common Seal (*Phoca vitulina*). Purchased.
27. 5 Margined Tortoises (*Testudo marginata*). Deposited.
13 European Tortoises (*Emys europæa*). Deposited.
28. 1 Egyptian Cat (*Felis chaus*). Presented by R. Glyn Griffiths, Esq.
29. 3 Common Kingfishers (*Alcedo ispida*). Presented by Mr. Fred. Houghton.
1 Red-legged Partridge (*Caccabis rufa*). Purchased.
31. 2 American Siskins (*Chrysomitris tristis*). Purchased.
2 Black Larks (*Melanocorypha nigra*). Purchased.
1 Cerastes Viper (*Vipera cerastes*). Purchased.

June 1. 2 Pig-tailed Monkeys (*Macacus nemestrinus*). Presented by H.H. The Rajah of Sarawak.
4 Lacertine Snakes (*Cœlopeltis lacertina*). Deposited.
1 Horseshoe Snake (*Zamenis hippocrepis*). Deposited.
1 Pleurodele Newt (*Pleurodeles walti*). Deposited.
2. 1 Barbary Ape (*Macacus inuus*), ♀. Deposited.
1 Buffon's Touracou (*Corythaix buffoni*). Purchased.
2 Varied Hemipodes (*Turnix varia*), ♂ and ♀. Purchased.
2 Bronze-winged Parrots (*Pionus chalcopterus*). Purchased.
3. 4 Elliot's Pheasants (*Phasianus ellioti*), 2 ♂ and 2 ♀. Deposited.
5 Ceylonese Terrapins (*Clemmys trijuga*). Deposited.
4 Bungoma River-Turtles (*Emyda granosa*). Deposited.
4. 1 King Parrakeet (*Aprosmictus scapulatus*), ♂. Presented by Mrs. Lewin.
10 Australian Wild Ducks (*Anas superciliosa*). Bred in the Gardens.
5. 1 Carpet-Snake (*Morelia variegata*). Purchased.
6. 2 Duyker Boks (*Cephalophus mergens*), ♂ and ♀. Presented by H. H. Trevor, Esq.
7. 1 Orang-Outang (*Simia satyrus*), ♀. Presented by J. M. Vermont, Esq. See P. Z. S. 1883, p. 463.
8. 1 Lesser Sulphur-crested Cockatoo (*Cacatua sulphurea*). Presented by J. Snowdon Henry, Esq., F.Z.S.
9. 1 Philippine Paradoxure (*Paradoxurus philippensis*). Presented by A. Burgess, Esq.
2 Aye-Ayes (*Chiromys madagascariensis*). Deposited.
2 Viperine Snakes (*Tropidonotus viperinus*). Presented by J. C J. Church, Esq.
1 Dark Green Snake (*Zamenis atrovirens*). Presented by J. C. J. Church, Esq.
10. 1 Hybrid Deer (between *Cervus luehdorfi* ♂ and *Cervus canadensis* ♀). Born in the Menagerie.
11. 2 Typical Mouse-Lemurs (*Chirogaleus typicus*). Purchased.
1 Earl's Weka Rails (*Ocydromus earlii*). Presented by Capt. R. Todd.
1 Black-backed Porphyrio (*Porphyrio melanotus*). Presented by Capt. R. Todd.
12. 1 Malbrouck Monkey (*Cercopithecus cynosurus*), ♂. Presented by L. Morris, Esq.
1 Macaque Monkey (*Macacus cynomolgus*), ♀. Presented by Mrs. E. J. H. Sprague.
3 Common Kingfishers (*Alcedo ispida*). Presented by the Hon. and Rev. F. G. Dutton.
1 Common Rhea (*Rhea americana*). Received in exchange.
13. 1 Malbrouck Monkey (*Cercopithecus cynosurus*), ♀. Presented by A. M. Moore, Esq.
1 Red-sided Eclectus (*Eclectus polychlorus*), ♀. Purchased.
1 Common Night-Heron (*Nycticorax griseus*). Presented by H. H. Blacklock, Esq.
1 Indian Python (*Python molurus*). Presented by G. E. Shute, Esq.
14. 1 Rhesus Monkey (*Macacus rhesus*), ♂. Presented by C. T. Pollock, Esq.
1 Japanese Deer (*Cervus sika*), ♂. Born in the Menagerie.
1 King Penguin (*Aptenodytes pennanti*). Presented by R. C. Packe, Esq. See P.Z.S. 1883, p. 463.

June 14. 2 Upland Geese (*Bernicla magellanica*), ♂ and ♀. Deposited.
2 Ruddy-headed Geese (*Bernicla rubidiceps*). Deposited.
4 Cornish Choughs (*Fregilus graculus*). Purchased.
15. 3 Common Pheasants (*Phasianus colchicus*), 1 ♂ and 2 ♀. Presented by H. T. Bowes, Esq.
1 Philantomba Antelope (*Cephalophus maxwelli*), ♀. Purchased.
1 Horned Lizard (*Phrynosoma cornutum*). Purchased.
1 Giant Toad (*Bufo agua*). Purchased.
1 Sykes's Monkey (*Cercopithecus albigularis*), ♀. Purchased.
2 Wandering Tree-Pies (*Dendrocitta vagabunda*). Purchased.
1 Indian Civet (*Viverricula indica*). Purchased.
1 Elate Hornbill (*Buceros elatus*). Purchased.
16. 1 Bonnet-Monkey (*Macacus sinicus*). Presented by F. Nelson, Esq.
2 Maugé's Dasyures (*Dasyurus maugæi*). Presented by Sir Louis S. Jackson, F.Z.S.
2 Indian Pythons (*Python molurus*). Deposited.
5 Red-bellied Conures (*Conurus vittatus*). Purchased.
1 Jardine's Parrot (*Pœocephalus gulielmi*). Purchased.
18. 1 Crab-eating Raccoon (*Procyon cancrivorus*), ♂. Presented by Theo. Walsh, Esq.
19. 1 Herring-Gull (*Larus argentatus*). Bred in the Gardens.
1 Goffin's Cockatoo (*Cacatua goffini*). Deposited.
2 Common Kingfishers (*Alcedo ispida*). Presented by Mr. T. E. Gunn.
20. 2 Hybrid Jungle-fowl (bred between *Gallus stanleyi* ♂ and *Gallus bankiva* ♀). Bred in the Gardens.
8 Gold Pheasants (*Thaumalea picta*). Bred in the Gardens.
21. 1 Puma (*Felis concolor*), ♀. Presented by J. Brown, Esq.
2 West-African Love-Birds (*Agapornis pullaria*). Purchased.
1 Indian Python (*Python molurus*). Purchased.
3 Common Vipers (*Vipera berus*). Presented by Mr. C. Taylor.
22. 2 Vulpine Phalangers (*Phalangista vulpina*), ♂ and ♀. Born in the Menagerie.
23. 1 Ring-tailed Coati (*Nasua rufa*), ♂. Presented by R. G. Hamilton, Esq.
2 Common Hedgehogs (*Erinaceus europæus*). Presented by Mr. S. Mummery.
2 Common Snakes (*Tropidonotus natrix*). Presented by Lord Arthur Russell, F.Z.S.
1 Ring-necked Parrakeet (*Palæornis torquatus*). Presented by Mr. W. Quail.
5 Common Vipers (*Vipera berus*). Purchased.
24. 6 Prairie Grouse (*Tetrao cupida*). Bred in the Gardens.
25. 1 Tree-Boa (*Corallus hortulanus*). Purchased.
1 Viperine Snake (*Tropidonotus viperinus*). Purchased.
2 Canadian Beavers (*Castor canadensis*), ♂ and ♀. Purchased.
1 Cape Ant-Bear (*Orycteropus capensis*). Purchased. See P.Z.S. 1883, p. 463.
12 Derbian Zonures (*Zonurus derbianus*). Purchased.
1 Japanese Deer (*Cervus sika*) ♂. Born in the Menagerie.
1 Vulpine Phalanger (*Phalangista vulpina*). Presented by Mr. J. E. Dothie.
1 Argus Pheasant (*Argus giganteus*). Bred in the Gardens.
1 Australian Crow (*Corvus australis*). Presented by Mrs. A. H. Jamrach.
26. 1 Impeyan Pheasant (*Lophophorus impeyanus*). Bred in the Gardens.

June 26. 4 Amherst's Pheasants (*Thaumalea amherstiæ*). Bred in the Gardens.
28. 1 Spotted Mud-Frog (*Pelodytes punctatus*). Presented by H. P. Cambridge, Esq.
1 Nicobar Pigeon (*Calœnas nicobarica*). Presented by Hugh Low, Esq.
29. 1 Hairy-footed Jerboa (*Dipus hirtipes*). Received in exchange.
1 Simon's Dwarf Jerboa (*Dipodillus simoni*). Received in exchange.
2 Common Gulls (*Larus canus*). Presented by C. W. Jervis Smith, Esq.
30. 1 Feline Douroucouli (*Nyctipithecus vociferans*). Presented by H. H. Thiele, Esq.
1 Indian Civet (*Viverricula indica*), ♀. Presented by Capt. Wilson.
2 Squirrel-like Phalangers (*Belideus sciureus*). Presented by A. Pretyman, Esq.
1 Hybrid Wild Ass ♂ (between *Equus hemippus* ♂ and *Equus tæniopus* ♀). Born in the Menagerie.

July 2. 3 Angulated Tortoises (*Chersina angulata*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
1 Geometric Tortoise (*Testudo geometrica*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
1 Areolated Tortoise (*Homopus areolatus*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
1 Robben-Island Snake (*Coronella phocarum*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
1 Laland's Ground-Snake (*Typhlops lalandii*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
2 Rufous Tinamous (*Rhynchotus rufescens*). Presented by E. M. Langworthy, Esq.
3 Spotted Tinamous (*Nothura maculosa*). Presented by E. M. Langworthy, Esq.
2 Cockateels (*Calopsitta novæ hollandiæ*). Presented by Mrs. Day.
3. 2 Red-crested Whistling Ducks (*Fuligula rufina*). Bred in the Gardens.
1 Variegated Sheldrake (*Tadorna variegata*). Bred in the Gardens.
5 Summer Ducks (*Aix sponsa*). Bred in the Gardens.
5 Chilian Pintails (*Dafila spinicauda*). Bred in the Gardens.
1 Indian Badger (*Arctonyx collaris*). Purchased.
1 Rough-billed Pelican (*Pelecanus trachyrhynchus*). Purchased. See P. Z. S. 1883, p. 463, pl. xlvi.
1 Dugés' Comb-Lizard (*Ctenosaura interrupta*). Purchased.
4. 1 Corn-Crake (*Crex pratensis*). Presented by J. W. Morison, Esq.
3 Picui Doves (*Columbula picui*). Purchased.
5. 2 Common Buzzards (*Buteo vulgaris*). Presented by James S. Cookson, Esq.
1 Margined Land-Tortoise (*Testudo marginata*). Presented by Lord Arthur Russell, M.P., F.Z.S.
6. 1 Tennent's Squirrel (*Sciurus tennenti*), ♂. Presented by A. Ross, Esq.
1 Jackdaw (*Corvus monedula*). Presented by Mr. J. Baldwin.
9. 2 Indian White-eyes (*Zosterops palpebrosus*). Received in exchange.
10. 1 Japanese Deer (*Cervus sika*), ♂. Born in the Menagerie.
1 Kinkajou (*Cercoleptes caudivolvulus*), ♀. Presented by H. V. Brackenburg, Esq.

July 11. 1 Syrian Fennec (*Canis famelicus*), ♀. Presented by J. H. James, Esq.
1 Slender-billed Cockatoo (*Licmetis tenuirostris*). Presented by Mrs. A. C. Biddle.
13. 1 Vervet Monkey (*Cercopithecus lalandii*), ♂. Deposited.
1 Moor-Macaque (*Macacus maurus*), ♂. Deposited.
1 Blau-bok (*Cephalophus pygmæus*), ♂. Presented by Ernest Honey, Esq.
1 Earl's Weka Rail (*Ocydromus earli*). Presented by Mrs. Wilson.
2 Tawny Owls (*Syrnium aluco*). Presented by J. Metcalf, Esq.
3 Upland Geese (*Bernicla magellanica*). Bred in the Gardens.
14. 1 Bonnet-Monkey (*Macacus sinicus*), ♀. Deposited.
1 Burrhel Wild Sheep (*Ovis burrhel*), ♀. Born in the Menagerie.
2 Black Guillemots (*Uria grylle*). Presented by H. Becher, Esq.
1 Black Howler (*Mycetes caraya*), ♂. Purchased.
15. 1 Spotted Cavy (*Cœlogenys paca*). Deposited.
2 Hairy-rumped Agoutis (*Dasyprocta pyrmnolopha*). Deposited.
2 Common Snakes (*Tropidonotus natrix*, var.). Deposited.
16. 1 Malbrouck Monkey (*Cercopithecus cynosurus*), ♂. Presented by Miss M. A. Waite.
1 Black-backed Jackal (*Canis mesomelas*), ♀. Presented by E. D. Thomas, Esq.
1 Philantomba Antelope (*Cephalophus maxwelli*). Presented by Capt. A. Maloney.
1 Duyker-bok (*Cephalophus mergens*). Presented by Capt. A. Maloney.
17. 1 Macaque Monkey (*Macacus cynomolgus*), ♀. Deposited.
13 Common Vipers (*Vipera berus*). Purchased.
1 Smooth Snake (*Coronella lævis*). Purchased.
5 Martinican Doves (*Zenaida martinicana*). Presented by J. A. Ward, Esq.
2 Porto-Rico Pigeons (*Columba corensis*). Presented by J. A. Ward, Esq.
2 Doves (*Leptoptila*, sp. inc.). Presented by J. A. Ward, Esq.
18. 1 Ring-tailed Parrakeet (*Palæornis torquata*). Presented by Mrs. Humphry.
1 St. Thomas's Conure (*Conurus xantholæmus*). Deposited.
2 Wonga-Wonga Pigeons (*Leucosarcia picata*). Bred in the Gardens.
19. 1 Ocelot (*Felis pardalis*), ♂. Deposited.
22. 2 Levaillant's Cynictis (*Cynictis penicillata*). Bred in the Gardens.
23. 4 Babirussas (*Babirussa alfurus*), 2 ♂, 2 ♀. Presented by Dr. F. H. Bauer, C.M.Z.S. See P.Z.S. 1883, p. 463, pl. xlvii.
1 Royal Python (*Python regius*). Presented by Dr. D. Hume Hart.
1 Two-spotted Paradoxure (*Nandinia binotata*), ♂. Presented by Dr. D. Hume Hart.
1 Australian Cassowary (*Casuarius australis*). Presented by Capt. Mann.
2 Peacock Pheasants (*Polyplectron chinquis*), 2 ♂. Deposited.
26. 1 Macaque Monkey (*Macacus cynomolgus*), ♂. Presented by J. W. Lucking, Esq.
4 Black Guillemots (*Uria grylle*). Presented by H. Becher, Esq.

July 27. 1 White-throated Capuchin (*Cebus hypoleucus*), ♂. Presented by F. Hoëy, Esq.

1 South-American Rat-Snake (*Spilotes variabilis*). Presented by C. A. Craven, Esq., C.M.Z.S.

1 Red-fronted Amazon (*Chrysotis vittata*). Deposited.

28. 1 Leopard (*Felis pardus*). Presented by Fred. Holmwood, Esq.

2 Short-headed Phalangers (*Belideus breviceps*), ♂ and ♀. Presented by T. H. Bowyer Bower, Esq., F.Z.S.

2 Bicheno's Finches (*Estrelda bichenovii*). Presented by T. H. Bowyer Bower, Esq., F.Z.S.

2 Crimson Finches (*Estrelda phaëton*). Presented by T. H. Bowyer Bower, Esq., F.Z.S.

1 Modest Grass-Finch (*Amadina modesta*). Presented by T. H. Bowyer Bower, Esq., F.Z.S.

1 Funereal Cockatoo (*Calyptorhynchus funereus*). Presented by T. H. Bowyer Bower, Esq., F.Z.S.

1 Saisset's Parrakeet (*Cyanorhamphus saisseti*). Presented by T. H. Bowyer Bower, Esq., F.Z.S.

1 New-Zealand Parrakeet (*Cyanorhamphus novæ-zealandiæ*). Presented by T. H. Bowyer Bower, Esq., F.Z.S.

2 Crested Pigeons (*Ocyphaps lophotes*), ♂ and ♀. Presented by T. H. Bowyer Bower, Esq., F.Z.S.

30. 2 Amherst's Pheasants (*Thaumalea amherstiæ*). Bred in the Gardens.

2 Summer Ducks (*Aix sponsa*). Bred in the Gardens.

31. 2 Indian Brush-tailed Porcupines (*Atherura fasciculata*). Presented by A. Dent, Esq.

1 Musk-Deer (*Moschus moschiferus*), ♂. Deposited.

Aug. 1. 1 Common Wombat (*Phascolomys wombat*), ♂. Deposited.

1 White Stork (*Ciconia alba*). Purchased.

3 Puffins (*Fratercula arctica*). Presented by H. Becher, Esq.

2. 2 Black-backed Jackals (*Canis mesomelas*). Presented by R. Southey, Esq.

2 Triangular-spotted Pigeons (*Columba guinea*). Presented by R. Southey, Esq.

1 Common Barn-Owl (*Strix flammea*). Presented by Mr. H. Hanauer.

2 Common Spoonbills (*Platalea leucorodia*). Purchased.

2 Purple Herons (*Ardea purpurea*). Purchased.

3. 1 Grivet Monkey (*Cercopithecus griseo-viridis*), ♂. Presented by Lord Hastings.

1 Common Boa (*Boa constrictor*). Deposited.

4. 1 Collared Fruit-Bat (*Cynonycteris collaris*). Born in the Menagerie.

1 Common Cormorant (*Phalacrocorax carbo*). Presented by W. R. Temple, Esq.

1 Common Cormorant (*Phalacrocorax carbo*). Deposited.

7. 1 Bonnet-Monkey (*Macacus sinicus*), ♂. Presented by the Hon. Mrs. Pigott Carleton.

2 Maholi Galagos (*Galago maholi*). Presented by Dr. Hugh Exton.

1 Rough Fox (*Canis rudis*). Presented by Clement J. Bateman, Esq.

1 Greater Sulphur-crested Cockatoo (*Cacatua galerita*). Deposited.

Aug. 7. 2 Barred-shouldered Doves (*Geopelia humeralis*). Bred in the Menagerie.
8. 3 Peregrine Falcons (*Falco peregrinus*). Presented by J. Snowdon Henry, Esq., F.Z.S.
1 Blackbird (*Turdus merula*). Presented by Mr. W. Marsh.
9. 1 American Black Bear (*Ursus americanus*), ♂. Presented by George Bishop, Esq., F.Z.S.
1 Wood-Owl (*Syrnium aluco*). Presented by G. Carrick Steet, Esq., F.R.C.S.
10. 1 ¾-bred Mesopotamian Deer (hybrid between *Dama mesopotamica* ♂ and *Dama vulgaris* ♀), ♂. Born in the Menagerie.
2 Javan Adjutants (*Leptoptilus javanicus*). Presented by the Hon. W. H. Ravenscroft.
2 Indian Tantalus (*Tantalus leucocephalus*). Presented by the Hon. W. H. Ravenscroft.
3 Indian Pythons (*Python molurus*). Purchased.
11. 2 Ring-tailed Lemurs (*Lemur catta*). Purchased.
1 Suricate (*Suricata zenik*), ♀. Presented by Charles H. Wootton, Esq.
1 Collared Peccary (*Dicotyles tajaçu*). Presented by Fritz Zurcher, Esq.
1 Sclater's Curassow (*Crax sclateri*), ♀. Presented by John Ardran, Esq.
12. 2 Mule Deer (*Cariacus macrotis*). Born in the Menagerie. See P.Z.S. 1883, p. 464.
13. 1 Quebec Marmot (*Arctomys monax*). Received in exchange.
2 Grey Squirrels (*Sciurus cinereus*). Received in exchange.
1 Plantain-Squirrel (*Sciurus plantani*). Received in exchange.
2 Silver-backed Foxes (*Canis chama*), ♂ and ♀. Presented by John Maydon, Esq.
1 Indian Python (*Python molurus*). Deposited.
14. 2 Russ's Weaver-birds (*Quelea russi*). Deposited.
3 Java Sparrows (*Padda oryzivora*). Deposited.
2 Saffron Finches (*Sycalis flaveola*). Deposited.
1 Goldfinch (*Carduelis elegans*). Deposited.
2 Common Bullfinches (*Pyrrhula europæa*). Deposited.
1 Common Chaffinch (*Fringilla cœlebs*). Deposited.
1 Lesser Redpole (*Linota rufescens*). Deposited.
1 Common Siskin (*Chrysomitris spinus*). Deposited.
2 Undulated Grass-Parrakeets (*Melopsittacus undulatus*). Deposited.
1 Grey-headed Love-bird (*Agapornis cana*). Deposited.
16. 2 Red-backed Shrikes (*Lanius collurio*). Presented by D. Bowl, Esq.
2 Spotted Salamanders (*Salamandra maculosa*). Presented by Miss Harris.
5 Blue-headed Pigeons (*Starnœnas cyanocephala*). Purchased.
17. 1 Isabelline Bear (*Ursus isabellinus*), ♂. Presented by A. W. Hicks Beach, Esq.
19. 1 Sparrow-Hawk (*Accipiter nisus*). Presented by Mr. F. Gunn.
5 Common Vipers (*Vipera berus*). Born in the Menagerie.
20. 1 Maholi Galago (*Galago maholi*). Purchased.
2 Hedgehogs (*Erinaceus europæus*). Presented by Mr. A. Lidbury.
1 Corn-Crake (*Crex pratensis*). Presented by Mr. M. Bryant.
21. 1 Partridge Bronze-winged Pigeon (*Geophaps scripta*). Presented by Mrs. Abrahams.

Aug. 21. 1 Modest Grass-Finch (*Amadina modesta*), ♀. Presented by Mrs. Abrahams.
6 Common Chameleons (*Chamæleon vulgaris*). Purchased.
1 Martinique Waterhen (*Porphyrio martinicus*). Deposited.
1 Vervet Monkey (*Cercopithecus lalandii*), ♀. Presented by Mr. J. H. Sheppard.
22. 2 Golden Eagles (*Aquila chrysaetos*). Presented by A. H. Browne, Esq.
2 Short-toed Eagles (*Circaetus gallicus*). Purchased.
1 Mississippi Alligator (*Alligator mississippiensis*). Presented by Cuthbert Johnson, Esq.
23. 1 Yellow Conure (*Conurus solstitialis*). Presented by Her Grace the Duchess of Wellington.
1 Slender-billed Cockatoo (*Licmetis tenuirostris*). Presented by R. Keele, Esq.
3 Red-faced Weaver-birds (*Foudia erythrops*). Received in exchange.
1 Hog-nosed Snake (*Heterodon platyrhinos*). Presented by F. J. Thompson, Esq.
24. 2 Violet Tanagers (*Euphonia violacea*), 2♀. Presented by E. H. Blomefield, Esq.
25. 6 Green Waxbills (*Estrelda formosa*). Purchased.
28. 1 Golden Eagle (*Aquila chrysaetos*). Presented by Bertram B. Hagen, Esq.
2 Long-eared Owls (*Asio otus*). Presented by Percy F. Fordham, Esq.
29. 4 Passerine Ground-Doves (*Chamæpelia passerina*). Purchased.
30. 1 Mocking-bird (*Mimus polyglottus*), ♀. Presented by A. Townsend, Esq.
1 Silvery Gibbon (*Hylobates leuciscus*), ♂. Purchased.
1 Common Boa (*Boa constrictor*). Purchased.
31. 1 Anaconda (*Eunectes murinus*). Purchased.
1 Sharp-nosed Crocodile (*Crocodilus cataphractus* ?). Purchased.
1 Boatbill (*Cancroma cochlearia*). Purchased.
1 Rhesus Monkey (*Macacus rhesus*), ♀. Presented by Miss Garwood.

Sept. 1. 2 Ostriches (*Struthio camelus*). Deposited.
2 Marsh-Harriers (*Circus æruginosus*). Presented by Lieut.-Col. E. Delmé Radcliffe.
1 Indian Muntjac (*Cervulus muntjac*), ♀. Purchased.
2 Barbary Apes (*Macacus inuus*), ♂ and ♀. Deposited.
1 North-African Jackal (*Canis anthus*). Presented by F. Powell, Esq.
3. 2 Stink-pot Terrapins (*Aromochelys odorata*). Presented by Capt. E. Cole.
1 Pennsylvanian Mud-Terrapin (*Cinosternon pennsylvanicum*). Presented by Capt. E. Cole.
1 Mississippi Alligator (*Alligator mississippiensis*). Presented by Capt. E. Cole.
1 Long-nosed Crocodile (*Crocodilus acutus*). Presented by Capt. E. Cole.
1 Pileated Jay (*Cyanocorax pileatus*). Purchased.
1 Spotted Tinamou (*Nothura maculosa*). Purchased.
4. 1 Getulian Ground-Squirrel (*Xerus getulus*). Presented by Geo. D. Cowan, Esq.

Sept. 4. 1 Grey Ichneumon (*Herpestes griseus*). Presented by Capt. W. F. Small.
1 Jackdaw (*Corvus monedula*). Purchased.
1 White-fronted Capuchin (*Cebus albifrons*). Purchased.
1 Black-faced Spider-Monkey (*Ateles ater*). Purchased.
5. 1 White-fronted Capuchin (*Cebus albifrons*). Presented by Miss A. Tanner.
6. 1 Common Squirrel (*Sciurus vulgaris*). Presented by Master C. B. Webster.
7. 2 Ruddy Finches (*Carpodacus erythrinus*). Purchased.
4 Eyed Lizards (*Lacerta ocellata*). Purchased.
1 Common Chameleon (*Chamæleon vulgaris*). Presented by F. L. B. Payne, Esq.
8. 2 Common Marmosets (*Hapale jacchus*). Presented by H. H. Forbes Eden, Esq.
3 Mexican Deer (*Cariacus mexicanus*), 1 ♂, 2 ♀. Presented by Capt. Edwin Cole.
11. 1 Snow-Bunting (*Plectrophanes nivalis*). Presented by E. J. Gibbins, Esq.
1 Glass-Snake (*Pseudopus pallasi*). Deposited.
12. 1 Vervet Monkey (*Cercopithecus lalandii*). Deposited.
2 Round-faced Monkeys (*Macacus cyclopis*), ♂ and ♀. Presented by G. A. Corder, Esq.
2 Ring-Doves (*Columba palumbus*), ♂ and ♀. Presented by Mrs. Courage.
1 Corn-Crake (*Crex pratensis*). Presented by Dr. Marshall.
5 Margined Tortoises (*Testudo marginata*). Deposited.
13. 1 Pig-tailed Monkey (*Macacus nemestrinus*). Presented by Robert Smith, Esq.
1 Hybrid Mesopotamian Deer (between *Dama mesopotamicus* and *Dama vulgaris*), ♀. Born in the Menagerie.
14. 1 Robben-Island Snake (*Coronella phocarum*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
1 Rufescent Snake (*Leptodira rufescens*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
1 Ring-hals Snake (*Sepedon hæmachates*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
15. 1 Hog Deer (*Cervus porcinus*), ♂. Presented by C. Charles Horne, Esq.
1 Grey Seal (*Halichœrus grypus*). Deposited.
17. 1 Fallow Deer (*Cervus dama*), ♀. Presented by Sir Henry Bessemer.
19. 1 Slender Ichneumon (*Herpestes gracilis*). Presented by Col. J. H. Bowker, F.Z.S.
2 White-whiskered Pigs (*Sus leucomystax*). Presented by Claude Scott Steuart, Esq.
2 Broad-snouted Caymans (*Alligator latirostris*). Presented by C. A. Craven, Esq., C.M.Z.S.
1 Yellow-billed Sheathbill (*Chionis alba*). Purchased.
1 White-eared Scops Owl (*Scops leucotis*). Purchased.
20. 1 Macaque Monkey (*Macacus cynomolgus*), ♂. Deposited.
1 Indian Antelope (*Antelope cervicapra*), ♂. Presented by Lady Brassey.
1 Grey Seal (*Halichœrus grypus*). Presented by J. J. Dodgshon, Esq.
2 Yarrell's Curassows (*Crax carunculata*), ♂ and ♀. Purchased.
2 Rufous Tinamous (*Rhynchotus rufescens*). Presented by J. Brown, Esq.

Sept. 21. 2 Small Hill-Mynahs (*Gracula religiosa*). Deposited.
1 Greater Sulphur-crested Cockatoo (*Cacatua galerita*). Deposited.
2 Persian Sheep (*Ovis aries*, var.), 2 ♂. Presented by Lady Brassey.
22. 1 White-fronted Capuchin (*Cebus albifrons*), ♂. Presented by Capt. Harrison.
1 Puma (*Felis concolor*). Presented by B. M. Whithard, Esq.
1 Grey Ichneumon (*Herpestes griseus*). Presented by Murray Dickinson, Esq.
1 Spanish Terrapin (*Clemmys leprosa*). Presented by — Aitchison, Esq.
25. 1 Pig-tailed Monkey (*Macacus nemestrinus*), ♂. Deposited.
1 Blotched Genet (*Genetta tigrina*). Presented by Surgeon Mosse, A.M.D.
1 Long-nosed Crocodile (*Crocodilus cataphractus*). Presented by Surgeon Mosse, A.M.D.
1 Herring-Gull (*Larus argentatus*). Presented by Dr. Günther, F.R.S.
1 Shag (*Phalacrocorax graculus*). Presented by Dr. Günther, F.R.S.
1 Common Curlew (*Numenius arquata*). Presented by Dr. Günther, F.R.S.
1 Oyster-catcher (*Hæmatopus ostralegus*). Deposited.
1 Common Curlew (*Numenius arquata*). Deposited.
1 Black-Death Adder (*Hoplocephalus nigrescens*). Purchased.
1 Annulated Worm-Snake (*Vermicella annulata*). Purchased.
26. 1 Egyptian Cat (*Felis chaus*). Presented by Lieut.-Colonel Mitchell Taylor.
1 Hoary Snake (*Coronella cana*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
7 European Phyllodactyles (*Phyllodactylus europæus*). Presented by Prof. Giglioli, C.M.Z.S.
1 River Jack-Viper (*Vipera rhinoceros*). Purchased.
28. 2 Kittiwake Gulls (*Rissa tridactyla*). Presented by Mr. Cuninghame.
1 Common Guillemot (*Uria troile*). Presented by Mr. Cuninghame.
7 Short-nosed Sea-Horses (*Hippocampus antiquorum*). Purchased.
29. 1 Bonnet-Monkey (*Macacus sinicus*), ♀. Presented by the Rev. G. R. Roberts.
1 White-fronted Capuchin Monkey (*Cebus albifrons*), ♂. Presented by Capt. King.

Oct. 1. 12 European Tree-Frogs (*Hyla arborea*). Presented by Mr. Carl Schorlemmer.
2. 1 Black Hornbill (*Buceros atratus*). Presented by J. T. Carrington, Esq.
2 Grey Monitors (*Varanus griseus*). Presented by Capt. J. S. Sanderson.
3. 2 Cockateels (*Calopsitta novæ hollandiæ*). Bred in the Gardens.
4. 1 Ocelot (*Felis pardalis*). Purchased.
2 Ariel Toucans (*Ramphastos ariel*). Purchased.
1 King Vulture (*Gypagus papa*). Purchased.
1 Brazilian Caracara (*Polyborus brasiliensis*). Purchased.
1 Anaconda (*Eunectes murinus*). Purchased.

Oct. 4. 1 Common Boa (*Boa constrictor*). Purchased.

1 Cape Hyrax (*Hyrax capensis*). Deposited.

2 Naked-necked Francolins (*Francolinus nudicollis*). Deposited.

1 Bubaline Antelope (*Alcelaphus bubalis*), ♀. Presented by Robert. Pitcairn, Esq.

1 Domestic Goat (*Capra hircus*), ♀. Presented by Robert. Pitcairn, Esq.

5. 2 Mandarin Ducks (*Æx galericulata*), ♂ and ♀. Bred in the Gardens.

6. 1 Great Bustard (*Otis tarda*), ♀. Deposited.

4 Ural Phrynocephales (*Phrynocephalus helioscopus*). Presented by Dr. A. Strauch, F.M.Z.S. See P. Z. S. 1883, p. 464.

8. 1 Rüppell's Parrot (*Pœocephalus rueppelli*), ♀. Presented by Geo. L. Galpin, Esq., M.D.

9. 1 Red-vented Parrot (*Pionus menstruus*). Purchased.

11. 1 White-fronted Capuchin (*Cebus albifrons*). Deposited.

12 Prairie Marmots (*Cynomys ludovicianus*). Received.

1 Michie's Tufted Deer (*Elaphodus michianus*), ♂. Deposited.

1 Michie's Tufted Deer (*Elaphodus michianus*), ♂. Purchased.

1 Elliot's Pheasant (*Phasianus ellioti*), ♂. Purchased.

1 Turtle-Dove (*Turtur communis*). Presented by Mr. W. M. Brown.

12. 2 Pileated Jays (*Cyanocorax pileatus*). Presented by Mrs. J. W. Hammond.

1 Malabar Parrakeet (*Palæornis columboides*). Presented by F. W. Bourdillon, Esq.

2 Rough-legged Buzzards (*Archibuteo lagopus*). Presented by Capt. H. Linklater.

1 Merlin (*Falco æsalon*). Presented by Capt. H. Linklater.

2 Eyras (*Felis eyra*). Purchased.

1 White-browed Amazon (*Chrysotis albifrons*). Purchased.

1 Egyptian Monitor (*Varanus niloticus*). Purchased.

13. 1 Macaque Monkey (*Macacus cynomolgus*). Deposited.

1 Collared Fruit-Bat (*Cynonycteris collaris*). Born in the Menagerie.

1 White-crested Tiger Bittern (*Tigrisoma leucolophum*). Presented by Joseph H. Cheetham, Esq., F.Z.S.

2 Royal Pythons (*Python regius*). Purchased.

14. 5 Lataste's Vipers (*Vipera latastii*). Presented by Lord Lilford, F.Z.S.

1 Viperine Snake (*Tropidonotus viperinus*). Presented by Lord Lilford, F.Z.S.

15. 1 Patas Monkey (*Cercopithecus patas*). Deposited.

1 Puma (*Felis concolor*). Received.

1 Smooth Snake (*Coronella lævis*). Presented by W. H. Payne, Esq.

16. 1 Geoffroy's Cat (*Felis geoffroii*). Presented by C. S. Barnes, Esq.

1 Chilian Sea-Eagle (*Geranoaetus melanoleucus*). Presented by C. S. Barnes, Esq.

1 Very Black Lemur (*Lemur nigerrimus*), ♂. Purchased.

1 Australian Fruit-Bat (*Pteropus poliocephalus*). Purchased.

1 Brown Bear (*Ursus arctos*). Deposited.

2 Black-footed Penguins (*Spheniscus demersus*). Deposited.

2 Bonnet-Monkeys (*Macacus sinicus*), ♂ and ♀. Presented by J. Verinder, Esq.

17. 1 Macaque Monkey (*Macacus cynomolgus*), ♀. Presented by W. H. B. Morris, Esq.

Oct. 18. 1 Bonnet-Monkey (*Macacus sinicus*), ♀. Presented by H. W. B. Morris, Esq.
1 Purple Gallinule (*Porphyrio cæruleus*). Presented by Mr. R. Dowling.
2 Cocteau's Skinks (*Macroscincus cocteauii*). Deposited.
19. 1 Yellow Baboon (*Cynocephalus babouin*). Purchased.
1 Gambian Pouched Rat (*Cricetomys gambianus*). Purchased.
1 Little Egret (*Ardea garzetta*). Purchased.
1 Slaty Egret (*Ardea gularis*). Purchased.
20. 1 Bonnet-Monkey (*Macacus sinicus*), ♂. Presented by Miss Stokes.
2 Redshanks (*Totanus calidris*). Purchased.
21. 1 Crested Porcupine (*Hystrix cristatus*). Presented by the Earl de Grey.
1 Golden-headed Conure (*Conurus auricapillus*). Presented by Mrs. Robins.
1 Æsculapian Snake (*Coluber æsculapii*). Presented by C. Horny, Esq.
22. 1 Common Squirrel (*Sciurus vulgaris*). Presented by Mrs. M. J. Mitchison.
1 Striped Hyæna (*Hyæna striata*). Presented by Ernest H. Marquis, Esq.
23. 1 Chipping Squirrel (*Tamais striatus*). Purchased.
3 Hudson's Bay Squirrels (*Sciurus hudsonius*). Purchased.
5 Thirteen-striped Sousliks (*Spermophilus tridecemlineatus*). Purchased.
1 Shaw's Gerbille (*Gerbillus shawi*). Received in exchange.
2 Simon's Dwarf Jerboas (*Dipodillus simoni*), ♂ and ♀. Received in exchange.
1 Hoary Fox (*Canis vetulus*). Presented by Mrs. H. E. Hunt.
24. 1 Chimpanzee (*Anthropopithecus troglodytes*), ♂. Purchased. See P. Z. S. 1883, p. 464.
1 Bald-headed Chimpanzee (*Anthropopithecus troglodytes*, var. *calvus*), ♀. Purchased.
1 Pinche Monkey (*Midas œdipus*). Deposited.
1 Margined Tortoise (*Testudo marginata*). Presented by Miss Mansell.
1 Purple-faced Monkey (*Semnopithecus leucoprymnus*), ♀. Deposited.
25. 1 Laughing Kingfisher (*Dacelo gigantea*). Presented by S. J. W. Calman, Esq.
2 Bramblings (*Fringilla montifringilla*), ♂ and ♀. Purchased.
1 Kestrel (*Tinnunculus alaudarius*). Presented by Mr. T. E. Gunn.
27. 2 Pintails (*Dafila acuta*), ♂ and ♀. Presented by Charles E. Baultbee, Esq.
2 Wigeons (*Mareca penelope*), ♂ and ♀. Presented by Charles E. Baultbee, Esq.
1 Black Rat (*Mus rattus*). Presented by Mr. Camp.
28. 2 Common Marmosets (*Hapale jacchus*). Deposited.
6 Lataste's Vipers (*Vipera latastii*). Born in the Menagerie.
30. 2 Crested Screamers (*Chauna chavaria*). Purchased.
1 Dwarf Chameleon (*Chamæleon pumilus*). Presented by Capt. J. C. Robinson.
31. 1 Common Otter (*Lutra vulgaris*). Purchased.

Nov. 1. 1 Globose Curassow (*Crax globicera*), ♀. Presented by Miss Beale.
1 Common Cormorant (*Phalacrocorax carbo*). Deposited.

Nov. 1. 1 Red-throated Diver (*Colymbus septentrionalis*). Presented by Mr. T. E. Gunn.
1 Common Heron (*Ardea cinerea*). Deposited.
1 Gannet (*Sula bassana*). Deposited.
2. 1 Black-eared Marmoset (*Hapale penicillata*). Presented by S. Sandbach Parker, Esq.
3. 1 Sykes's Monkey (*Cercopithecus albigularis*), ♂. Presented by Thomas L. M. Rose, Esq.
5. 7 Coypus (*Myopotamus coypus*). Born in the Menagerie.
1 Masked Parrakeet (*Pyrrhulopsis personata*). Presented by Miss J. D. Smith.
6. 1 Peregrine Falcon (*Falco peregrinus*). Deposited.
7. 1 Goffin's Cockatoo (*Cacatua goffini*). Deposited.
1 Mexican Eared Owl (*Asio mexicanus*). Purchased.
1 Downy Owl (*Pulsatrix torquata*). Purchased.
1 Alligator (*Alligator mississippiensis*). Presented by Ronald Bridgett, Esq.
1 Alligator (*Alligator mississippiensis*). Presented by Mrs. M. E. Symonds.
8. 1 Bonnet-Monkey (*Macacus sinicus*), ♂. Presented by C. R. Browne, Esq.
9. 1 Bennett's Wallaby (*Halmaturus bennettii*), ♀. Purchased.
2 Black Wallabys (*Halmaturus ualabatus*), 2 ♂. Purchased.
1 Yellow-footed Rock-Kangaroo (*Petrogale xanthopus*), ♂. Purchased.
3 Long-eared Owls (*Asio otus*). Presented by C. Purnchard, Esq.
1 Kestrel (*Tinnunculus alaudarius*). Presented by John Colebrook, Esq., F.Z.S.
1 Annulated Worm-Snake (*Vermicella annulata*). Purchased.
10. 2 Bar-breasted Finches (*Munia nisoria*). Presented by Mr. J. Abrahams.
2 Gold Pheasants (*Thaumalea picta*), ♂ and ♀. Presented by Sir H. W. Tyler. See P. Z .S. 1883, p. 598.
2 Red-tailed Guans (*Ortalis ruficauda*). Presented by Alfred C. Priestley, Esq.
12. 1 Sambur Deer (*Cervus aristotelis*), ♀. Born in the Menagerie.
1 Greater Sulphur-crested Cockatoo (*Cacatua galerita*). Deposited.
6 American Box-Tortoises (*Terrapene carinata*). Presented by Samuel Garman, Esq., C.M.Z.S.
1 Stink-Pot Terrapin (*Aromochelys odorata?*). Presented by Samuel Garman, Esq., C.M.Z.S.
1 Alligator Terrapin (*Chelydra serpentina*). Presented by Samuel Garman, Esq., C.M.Z.S.
7 Spotted Lizards (*Holbrookia maculata*). Presented by Samuel Garman, Esq., C.M.Z.S.
1 Long-nosed Snake (*Heterodon nasicus*). Presented by Samuel Garman, Esq., C.M.Z.S.
2 Striped Snakes (*Tropidonotus sirtalis*). Presented by Samuel Garman, Esq., C.M.Z.S.
2 Yellow-throated Snakes (*Herpetodryas flavigularis*). Presented by Samuel Garman, Esq., C.M.Z.S.
13. 1 Common Viper (*Vipera berus*). Presented by W. H. B. Pain, Esq.
1 Cerastes Viper (*Vipera cerastes*). Deposited.
14. 1 Negro Tamarin (*Midas ursulus*). Purchased.

Nov. 14. 1 Sykes's Monkey (*Cercopithecus albigularis*). Purchased.
1 Downy Owl (*Pulsatrix torquata*). Purchased.
1 Indian Badger (*Arctonyx collaris*), ♂. Purchased.
16. 2 Père David's Deer (*Cervus davidianus*), ♂ and ♀. Purchased. See P. Z. S. 1883, p. 598.
1 Grey Ichneumon (*Herpestes griseus*). Presented by Mrs. F. R. Flindell.
1 Hobby (*Falco subbuteo*). Presented by Mr. C. Heat.
17. 1 Orang-Outang (*Simia satyrus*), ♂. Presented by Mr. William Cross.
19. 1 Michie's Tufted Deer (*Elaphodus michianus*), ♂. Deposited.
1 Michie's Tufted Deer (*Elaphodus michianus*), ♀. Purchased.
1 Chinese Water-Deer (*Hydropotes inermis*). Purchased.
2 Elliot's Pheasants (*Phasianus ellioti*), ♂ and ♀. Purchased.
6 Coal Titmice (*Parus ater*). Purchased.
20. 1 Bonnet-Monkey (*Macacus sinicus*). Presented by Miss Morant.
4 Moorish Toads (*Bufo mauritanicus*). Presented by F. Bridges, Esq.
21. 12 Ruffe or Pope (*Acerina cernua*). Presented by Mr. T. E. Gunn.
23. 1 Bonnet-Monkey (*Macacus sinicus*), ♀. Presented by H. G. Rose, Esq.
1 Common Fox (*Canis vulpes*). Presented by H. Vaughan, Esq.
2 Bullfinches (*Pyrrhula europæa*), 2 ♂. Presented by A. Aitchison, Esq.
24. 1 Spotted Ichneumon (*Herpestes nepalensis*). Received in exchange.
5 Blue-crowned Hanging Parrakeets (*Loriculus galgulus*). Received in exchange.
1 Red-capped Parrot (*Pionopsitta pileata*). Purchased.
26. 2 Common Wolves (*Canis lupus*), ♂ and ♀. Purchased.
28. 1 Dufresne's Amazon (*Chrysotis dufresniana*). Purchased.
30. 1 Indian Gazelle (*Gazella bennetti*), ♀. Born in the Menagerie.
1 Moorhen (*Gallinula chloropus*). Presented by Mr. T. E. Gunn.
1 Home's Cinixys (*Cinixys homeana*). Purchased.

Dec. 1. 2 Common Carp (*Cyprinus carpio*). Purchased.
3. 20 Barbary Turtle-Doves (*Turtur risorius*). Presented by A. F. Hirsch, Esq., F.Z.S.
2 Bearded Titmice (*Panurus biarmicus*), ♂ and ♀. Presented by H. D. Astley, Esq., F.Z.S.
5. 1 Water-Rail (*Rallus aquaticus*). Presented by E. G. B. Meade Waldo, Esq.
6. 1 Indian Crocodile (*Crocodilus palustris*). Presented by Sir Joseph Fayrer, F.Z.S.
2 Indian Crocodiles (*Crocodilus palustris*). Deposited.
7. 2 Scaly-breasted Lorikeets (*Trichoglossus chlorolepidotus*). Deposited.
1 Golden-crowned Conure (*Conurus aureus*). Deposited.
4 West-African Love-Birds (*Agapornis pullaria*). Deposited.
2 Undulated Grass-Parrakeets (*Melopsittacus undulatus*). Deposited.
1 Cockateel (*Calopsitta novæ hollandiæ*). Deposited.
8. 1 Hairy Porcupine (*Sphingurus villosus*). Purchased.
2 Cirl Buntings (*Emberiza cirlus*), 2 ♂. Purchased.

Dec. 9. 1 Lesser White-nosed Monkey (*Cercopithecus petaurista*), ♂. Presented by the Rev. W. C. Willoughby.

10. 1 Egyptian Monitor (*Varanus niloticus*). Purchased.

2 Barbary Turtle-Doves (*Turtur risorius*). Presented by Miss Stewart.

13. 4 Ring-hals Snakes (*Sepedon hæmachates*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.

1 Hoary Snake (*Coronella cana*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.

14. 1 Black-faced Kangaroo (*Macropus melanops*), ♂. Purchased.

1 White-handed Lemur (*Lemur albimanus*), ♂. Purchased.

15. 1 Night-Heron (*Nycticorax griseus*). Presented by N. H. Fenner, Esq.

16. 1 Macaque Monkey (*Macacus cynomolgus*), ♂. Presented by J. L. Waldon, Esq.

18. 1 Toque Monkey (*Macacus pileatus*), ♀. Presented by J. H. Barker, Esq.

1 Moorhen (*Gallinula chloropus*). Presented by Mr. T. E. Gunn.

1 Pied Wagtail (*Motacilla lugubris*). Purchased.

19. 2 St. Thomas's Conures (*Conurus xantholæmus*). Presented by C. Wallis Enslie, Esq.

20. 1 Macaque Monkey (*Macacus cynomolgus*), ♂. Presented by Dr. Douglas.

1 Gannet (*Sula bassana*). Presented by J. C. Baxter, Esq.

21. 1 Slaty Egret (*Ardea gularis*). Purchased.

22. 1 Common Marmoset (*Hapale jacchus*). Presented by Mrs. Archer.

2 Fringed-lipped Lamperns (*Petromyzon branchialis*). Presented by the Rev. F. T. Wethered.

24. 1 Rhesus Monkey (*Macacus rhesus*), ♂. Presented by Miss P. Crabtree.

28. 1 Alligator (*Alligator mississippiensis*). Presented by Mr. Thick.

29. 1 Campbell's Monkey (*Cercopithecus campbelli*), ♀. Presented by Walter Van Weede, Esq.

1 Ring-tailed Coati (*Nasua rufa*), ♂. Deposited.

31. 1 Common Genet (*Genetta vulgaris*). Presented by Capt. A. North Daniel.

2 Porose Crocodiles (*Crocodilus porosus*). Presented by Capt. Martin Thackeray.

1 Ring-hals Snake (*Sepedon hæmachates*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.

1 Robben-Island Snake (*Coronella phocarum*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.

1 Egyptian Cobra (*Naia haje*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.

1 Rhomb-marked Snake (*Psammophylax rhombeatus*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.

1 Many-spotted Snake (*Coronella multimaculata*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.

1 Smooth-bellied Snake (*Homalosoma lutrix*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.

1 Hissing Sand-Snake (*Psammophis sibilans*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.

1 Infernal Snake (*Boodon infernalis*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.

1 Spotted Slowworm (*Acontias meleagris*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.

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